THE INTERNATIONAL MAGAZINE OF METHODS FOR ENGINEERING/OPERATING PEOPLE

Petroleum Engineer INTERNATIONAL

NOVEMBER 1980 • $3.00 PER COPY

[illegible]

20515 153150 PEI
19797 D
STAT REFERNCE INDEX
CONGRESSIONAL INFORMATION SVC
7101 WISCONSIN AVE
WASHINGTON DC 20014

ENHANCED RECOVERY

- Crude Response To CO_2 Slugs, p. 42
- Unconvential And Convential Gas, p. 20
- Removing Nitrogen From Natural Gas, p. 50
- New Approach To Secondary Recovery, p. 27

Mixed Emotions Greet Rig Record

Euphoria that greeted the record high rig count on September 29 was tempered somewhat by a reminder from C. John Miller, president of the Independent Petroleum Association of America, that it is not realistic to compare the number of rotary drilling rigs active today with the number active in 1955.

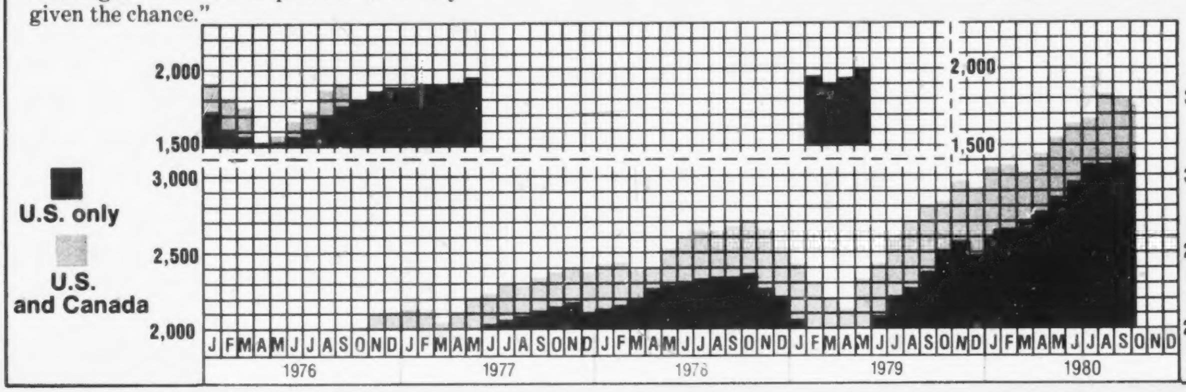
"Back then," Miller pointed out, "we (the U.S.) were consuming 8.4 million b/d. In 1979, consumption was 18.4 million b/d – a 117% increase. It is clearly not good enough in 1980 to remain satisfied with a 1955 drilling pace."

Miller did emphasize, however, that the increased activity is a very positive sign. "What these figures prove, and I hope demonstrate to this nation's leaders, is that the oil and gas industry is prepared to meet the challenges of increased production if only given the chance."

Rotary Rigs Actually Making Hole In United States & Canada

As Reported to International Association of Drilling Contractors by Hughes Tool Company

	Sept. 15, 1980	Sept. 22, 1980	Sept. 29, 1980	Oct. 6, 1980
Alabama	15	14	15	14
Alaska				
Land	10	13	12	12
Offshore	2	2	1	1
Arkansas	31	30	33	35
Arizona	1	1	0	1
California				
Land	106	110	109	100
Offshore	17	17	17	17
Total	123	127	126	117
Colorado	74	76	75	75
Florida	6	5	4	4
Idaho	1	1	1	1
Illinois	30	30	20	24
Kansas	144	145	143	142
Kentucky	1	1	1	0
North Louisiana	57	60	61	57
South Louisiana				
Inland Waters	75	80	78	79
Land	167	167	174	170
Offshore	148	146	141	143
Total	447	453	454	449
Michigan	34	32	35	35
Mississippi	54	57	54	51
Montana	55	59	58	55
Nebraska	12	15	18	18
Nevada	7	7	7	6
New Mexico	132	130	129	126
New York	7	6	6	6
North Dakota	86	84	92	87
Ohio	81	80	83	85
Oklahoma	456	440	450	452
Oregon	1	1	1	1
Pennsylvania	35	36	37	37
Rhode Island				
Offshore	2	2	2	2
South Dakota	1	1	1	1
Tennessee	1	1	1	1
Texas				
Offshore	64	64	69	72
Dist. 1	42	48	47	42
Dist. 2	52	53	54	53
Dist. 3	167	162	165	172
Dist. 4	105	100	99	103
Dist. 5 & 6	116	127	121	122
Dist. 7B	75	78	82	80
Dist. 7C	72	72	71	70
Dist. 8	113	105	109	103
Dist. 8A	69	72	77	73
Dist. 9	80	79	70	70
Dist. 10	51	59	58	55
Total	1016	1019	1022	1015
Utah	50	55	55	53
Washington State	1	1	1	1
West Virginia	38	45	46	43
Wyoming	161	155	155	165
Total U.S.	3115	3124	3138	3115
Western Canada	423	408	378	369
Eastern Canada	9	9	9	9
U.S. and Canada	3547	3541	3525	3493



PETROLEUM ENGINEER INTERNATIONAL • 800 Davis Building • Dallas, Texas 75202 • **TWX** 910-861-9306

Abbott Sparks	President
John G. Grant	Publisher and Vice President
W. B. Bleakley	Editor
Richard D. McNally	Associate Editor
Mary Jane Ellis	Assistant Editor
Laura Jacobus	Assistant Editor
Edna Taylor	Editorial Assistant
J. E. (Hank) Kastrop	Consulting Editor
Renn Rothrock, Jr.	Consulting Editor
Ernestine Adams	Editor, Energy Management Rpt.
Julie Fonner	EMR Assistant Editor
Gregory Martin	Editor, Energy News/Energy Week
Sharon Hutcheson	Editorial Assistant
George O. Ives	Offshore Technology Editor

4151 Southwest Frwy., Suite 115, Houston, Tex. 77027

•

Alan Hilton	Service R&D Manager
Denise Tevis	Service R&D Department
Diane Mosman	Reader Service

•

ADVERTISING SALES OFFICES

EASTERN: Richard Martin, P.O. Box 89, Tennent, New Jersey 07763, (201) 446-3230

CHICAGO 60646: Bill Facinelli, Dwain Holmgren 4761 West Touhy Ave., Lincolnwood, Illinois, (312) 679-1100

OHIO, WESTERN PA.: Dwain Holmgren, 4761 West Touhy Avenue, Lincolnwood, Illinois (312) 679-1100

LOS ANGELES 91106: Bruce Berkey, 61 S. Lake Ave., Box 4566, Pasadena, Calif., (213) 681-0685.

HOUSTON 77027: Jess Adkins, Vice Pres., Gulf Coast Regional Manager, **Barry Biklen, Hal Odum,** 4151 Southwest Freeway, Suite 115, (713) 626-7850

DALLAS 75202: Ed Sealey, 800 Davis Bldg., (214) 748-4403. TWX 910-861-9306

WEST TEXAS: Rusty Meador, P.O. Box 611, Eldorado, Texas 76936 (915) 853-2689

UNITED KINGDOM, NETHERLANDS, SCANDINAVIA: Intergroup Communications, Inc., **Wallace K. Ponder, Paul Dimmock,** 31, Lyncroft Ave., Pinner, Middlesex HA5 1JU, England, (01) 868-9289, Cable: PACOM PINNER (U.K.)

FRANCE, ITALY, BELGIUM, SWITZERLAND: Gerard Lasfargues, 32, rue Desbordes Valmore, 75016-Paris, France, Telephone: 504 97 94

JAPAN: Mashy Yoshikawa, Orient Echo, Inc., 11th Floor Sankyo Bldg., 7-12 Tsukiji 2-chome, Chuo-ku, Tokyo, Telephone: 541-4923, Cable: MYORIENTECHO

GERMANY, AUSTRIA: S.I.P.A.S., **Wlm. J. M. Sanders, Paul J. Verburt,** Raadhuisstraat 24, P.O. Box 25, 1484 EN Graft-de Ryp, Holland, Telephone 02997-1303 and 3660. Telex: 13039 sipas nl, Telegrams: SIPAS-Amsterdam

Jane Dietz	Production Department Manager
Don Fickert	Graphics Director
Janell Fowler	Production Manager
Debbie Cooper	Production Coordinator
Bart Blankenburg	Presentation
James Duke	Presentation
Victoria Valentin	Presentation
Laura Page	Presentation

•

Gary Hogan	Business Manager
Jack Schabel	Circulation Director
Royal Courtney	Circulation Fulfillment Manager
Gary Rothell	Classified Advertising Manager

ENERGY PUBLICATIONS

• a Division of Harcourt Brace Jovanovich •

P.O. BOX 1589 • 800 DAVIS BUILDING
DALLAS, TEXAS 75221 • (214) 748-4403

PETROLEUM ENGINEER INTERNATIONAL
Pipeline & Gas Journal
Energy Management Report
Energy News • Energy Week

A HARCOURT BRACE JOVANOVICH PUBLICATION

ABP

ABC

EDITORIAL ADVISORY COMMITTEE
Lloyd E. Elkins, Petroleum Consultant
Bennie L. Franks, Vice President, Production Operations, Sun Production Co.
Dennis E. O'Brien, Technology Section Head, Exxon Chemical Company
B. R. Jones, President, Eagle Production and Drilling Co.
Frank Schuh, Director of Engineering Development, ARCO Oil and Gas Co., a Division of Atlantic Richfield Co.
Marius J. Mes, Senior Research Scientist, Production Research Department, Conoco Inc.

PETROLEUM ENGINEER INTERNATIONAL (USPS 429-380) published 15 times each year, monthly plus March 15, July 15 and November 15, by Energy Publications Division, Harcourt Brace Jovanovich, P.O. Box 1589, Dallas, Texas 75221.

November, 1980, Volume 52, No. 13.

Copyright© 1980 by Harcourt Brace Jovanovich, Inc. All rights reserved. No part of this publication may be transmitted or reproduced in any form or by any means, electronic or mechanical, including photocopy, recording, or any information storage and retrieval system, without permission in writing from the publisher.

Subscription rate to personnel employed by companies involved with exploration, drilling, production, or field processing of oil or gas: one year $12.00, two years $18.00, three years $24.00 for North, Central, and South America. Outside North, Central, and South America: one year $25.00, two years $35.00, three years $45.00. Subscription rate for all others: $25.00 for one year. Single copy price $3.00. Entered as second class mail matter January 15, 1949, at the post office in Dallas, Texas, under the act of March 3, 1879. Microfilm copies are available through University Microfilms, Inc., 313 North First Street, Ann Arbor, Michigan. Indexed by Applied Science, Technology Index and the Engineering Index, Inc.

Postmaster: Send address changes to PETROLEUM ENGINEER INTERNATIONAL, P.O. Box 1589, Dallas, Texas 75221, USA.

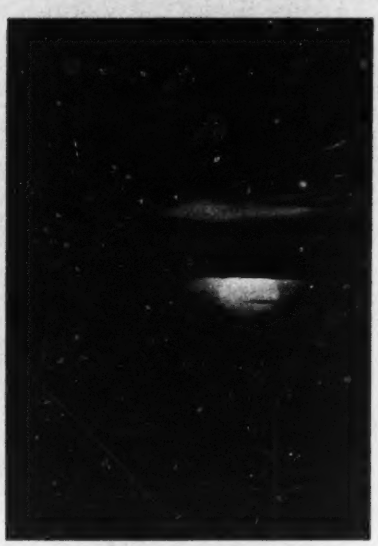
HARCOURT BRACE JOVANOVICH PUBLICATIONS

ROBERT L. EDGELL, Chairman; RICHARD MOELLER, President; LARS FLADMARK, Executive Vice President; ARLAND HIRMAN, Treasurer; JOE BILDERBACH, Vice President; JAMES GHERNA, Vice President; GEORGE GLENN, Vice President; THOMAS GRENEY, Vice President; EZRA PINCUS, Vice President; HARRY RAMALEY, Vice President; LOIS SANDERS, Vice President; ABBOTT SPARKS, Vice President. OFFICES: 757 Third Avenue, New York, N.Y. 10017. Phone: (212) 888-4444; 1 East First Street, Duluth, Minnesota 55802. Phone (218) 727-8511. 111 East Wacker Drive, Suite 1730, Chicago, Ill. 60601. Phone (312) 938-2300.

Petroleum Engineer® INTERNATIONAL

The international magazine of methods for engineering/operating people

NOVEMBER 1980 NUMBER 13 VOLUME 52



ABOUT THE COVER: The West Texas sun sets behind pumps and pipes of a major enhanced recovery test using carbon dioxide. [Photo courtesy of Standard Oil Co. (Indiana).]

NEXT ISSUE: The second annual Offshore Operations Report will highlight a PETROLEUM ENGINEER International Extra to be published November 15.

ENHANCED RECOVERY

Sun Gas President Talks About Unconventional And Conventional Gas 20
In an exclusive interview, Robert B. Anderson says his company expects to have more wells being drilled for unconventional gas by the late 1980s than for so-called conventional gas.

New Approach To Secondary Recovery 27
by A. F. van Everdingen and Hyla Swesnik Kriss, DeGolyer and MacNaughton

Response Of An Ellenburger Crude to CO_2 Slugs Pushed By Nitrogen 42
by William A. Aud, Daniel D. Fischer, Raymond A. Haas, Mark S. Gerding, and Paul B. Crawford, Texas A&M University

How To Take Nitrogen Out Of A Gas Stream 50
by J. L. Joplin, Oil & Gas Supply Co., and J. F. Joplin, Oil & Gas Cryogenics

Well Completions And Workovers—Part 11 56
by L. Douglas Patton, H. K. van Poollen and Associates Inc., and W. A. Abbott, Great Eastern Energy and Development Corp.

Computer Output Compares Hydraulic Maximizing Estimates With Laminar Flow Constraints 70
by Alan G. Arbizu and Rodney McGinnis, Milchem Inc.

Downhole Steam Generator Shows Merit 82
Staff Report

Predicting Bottomhole Pressure For Gas And Gas Condensate Wells 90
by Michael Arnondin, Michiel van Poollen, and Fred F. Farshad, University of Southwestern Louisiana

Petroleum Engineering Quiz 124
Great professor is John M. Niedzwecki, Texas A&M University

In-Situ Hydrates—A Potential Gas Source 112
by L. J. Franklin, Panarctic Oils Ltd.

EDITORIAL DEPARTMENTS

News Hi-lites 1
Significant Happenings in Petroleum

Course of Oil 6
Bungling Bureaucrats — the Waste Makers

Technology Trends 8
Forecasts from Current Events

Offshore Technology 10
Buoy Monitors Seismic Activity

Continuous Tables 125

Drilling/Exploration 132
Contrasting Energy Approaches

Industry Meeting Calendar 142

Company News 150

Book Reviews 162

Petroleum Profiles 156
Five minutes with Fred Poettmann

Professional Directory 165

Classified Advertising 166

Index to Advertisers EM 16

ENERGY management report™

by Ernestine Adams

	EM
Comment	1
Energy World Report	2
International Design/ Engineering	4
Offshore Energy Business	6
Financial Notebook	8
New Products	10

NOTE

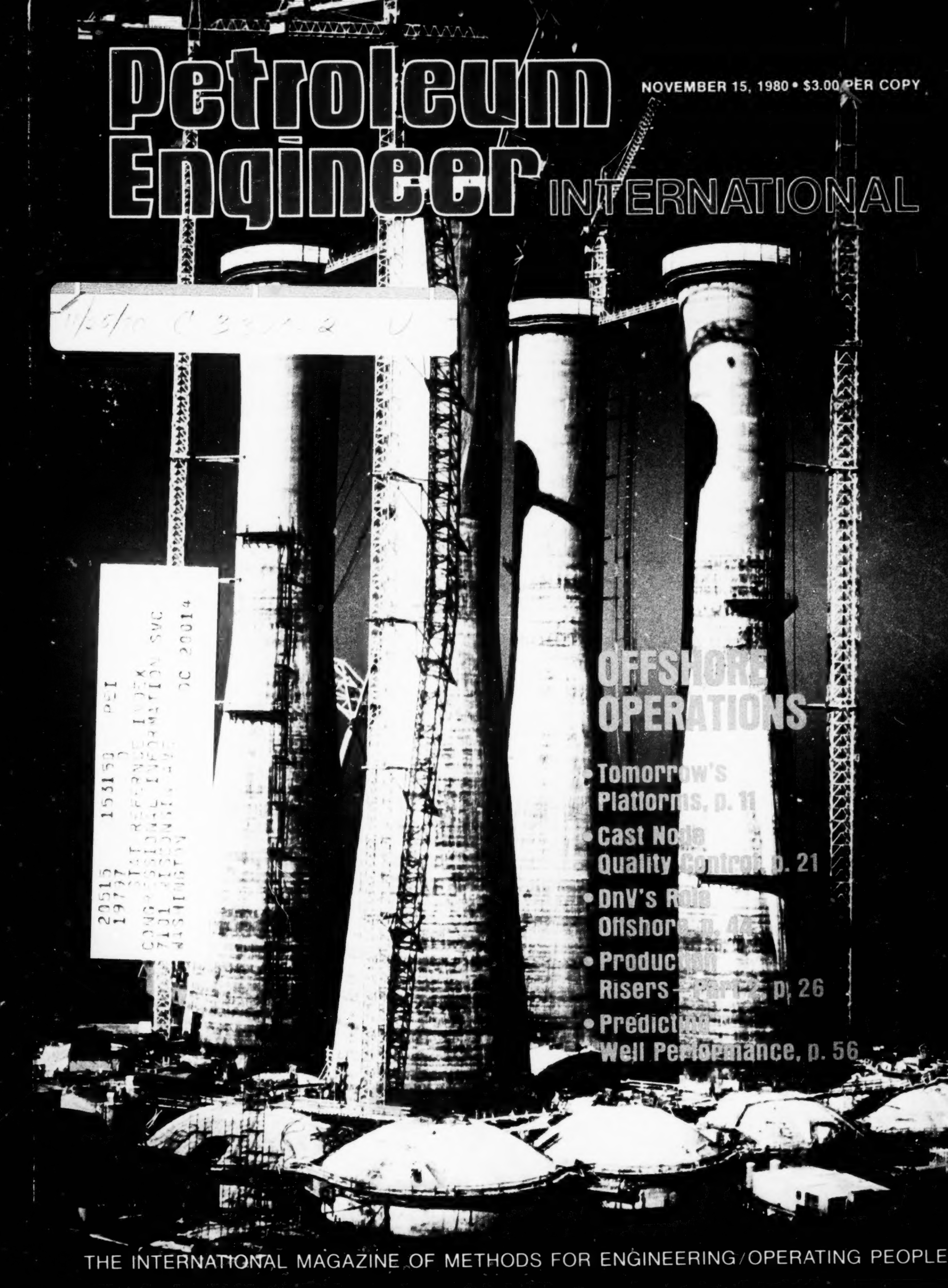
ONLY THE FOLLOWING PAGES OF THIS

PUBLICATION HAVE BEEN FILMED

Cover 1, p. 4, 63-64.

Petroleum Engineer INTERNATIONAL

NOVEMBER 15, 1980 • $3.00 PER COPY



11/5/80 C 3311-2 U

20515 153150 PEI
19737 D
STAT REFERENCE INDEX
CONGRESSIONAL INFORMATION SVC
7101 WISCONSIN AVE
WASHINGTON DC 20014

OFFSHORE OPERATIONS

- Tomorrow's Platforms, p. 11
- Cast Node Quality Control, p. 21
- DnV's Role Offshore, p. 44
- Production Risers—Part 2, p. 26
- Predicting Well Performance, p. 56

THE INTERNATIONAL MAGAZINE OF METHODS FOR ENGINEERING/OPERATING PEOPLE

ABOUT THE COVER: Statfjord B, the world's largest concrete platform, is also the first four-legged Condeep ever built. But it is only a portent of things to come (see p. 11). Cover photo shows base of Statfjord B under construction in Gandsfjord, near Stavanger, Norway.

NEXT MONTH: The annual Area of Promise issue in December takes a look at what operators are doing to accelerate production and improve recovery from old reservoirs that failed to qualify for workovers or infill drilling under previous pricing conditions.

Petroleum Engineer® INTERNATIONAL

The international magazine of methods for engineering/operating people

NOVEMBER 15, 1980 NUMBER 14 VOLUME 52

OFFSHORE OPERATIONS

Tomorrow's North Sea Platforms 11

by Steven D. Moore, Technical Editor
Unconventional offshore technology will be required to untap many reserves previously passed over as uncommercial.

Cast Steel Nodes – Inspection And Quality Control 21

by G. J. Marston, British Steel Corp.
Realization of advantages of cast joints depends on quality standards that will assure their outperformance of welded joints.

Modern Production Risers – Part 2 26

by George W. Morgan, Engineering Consultant
Form of the riser depends on design and implementation of the overall production system.

Jakob Eri Discusses Det Norske Veritas' Role In Offshore Oil 44

Exclusive interview with an executive vice president of Det norske Veritas. It started when Phillips began development of Ekofisk and Veritas was asked by the government to look after safety aspects.

How To Relate Basic Equations To Predict Gas Well Performance 56

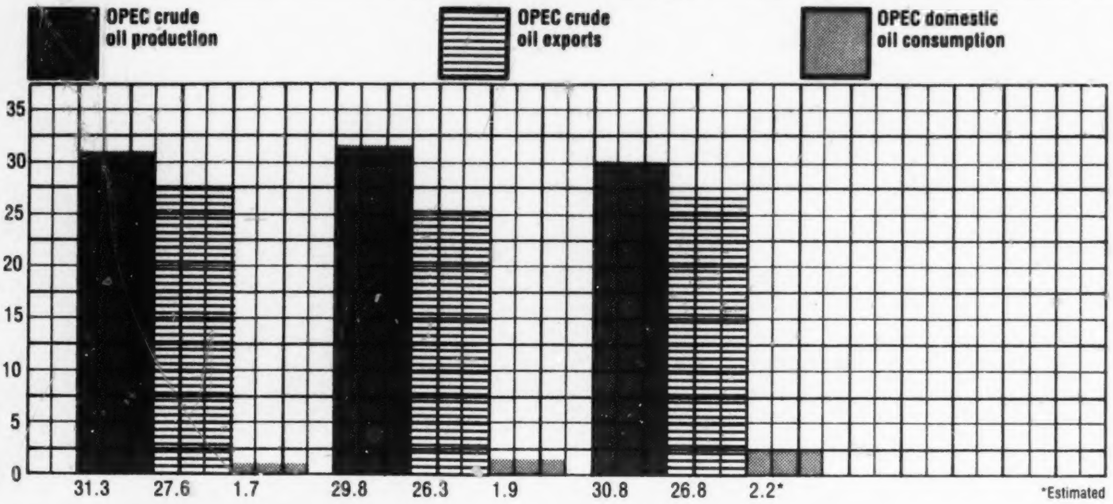
by Zoltan Bessenyei, Mountain Fuel Supply Co.
The pressure-volume equation can be combined with the back-pressure formula and hyperbolic decline equation.

EDITORIAL DEPARTMENTS

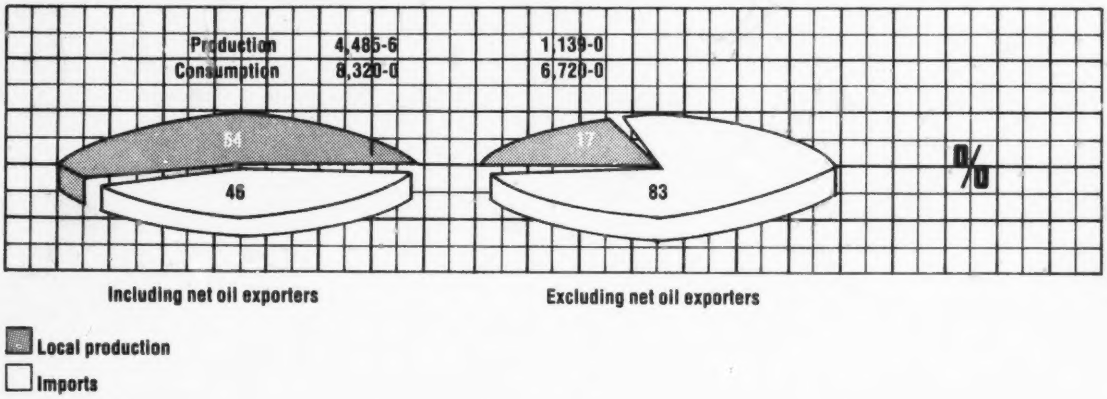
News Hi-lites 1
Significant Happenings in Petroleum
Course of Oil 6
Economics Spur Operations
Technology Trends 8
Forecasts from Current Events
Continuous Tables 63
Petroleum Profiles 70
New Products 74
Company News 84
Index to Advertisers 88

OPEC Statistics At A Glance

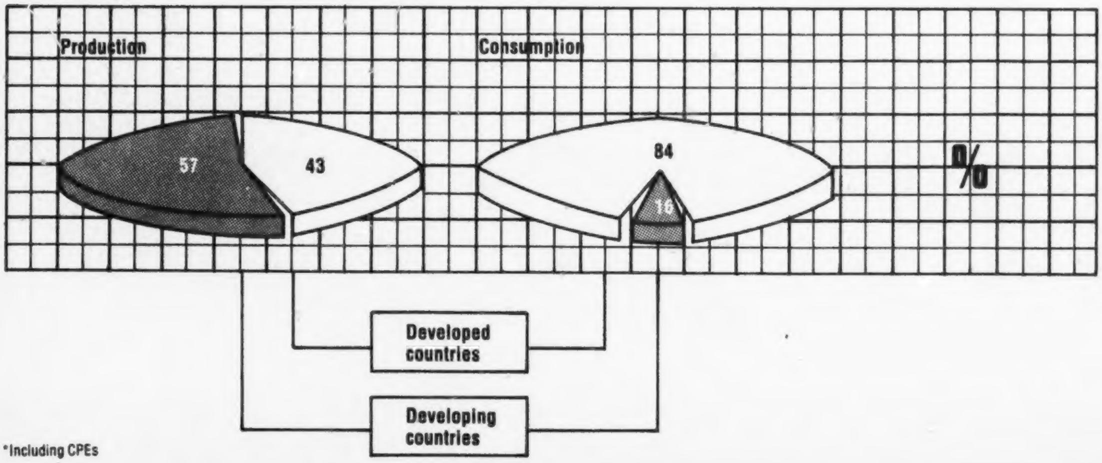
Main OPEC statistics at a glance, MMb/d



Non-OPEC developing countries oil production & consumption 1978, Mb/d



Comparison-oil production and consumption in developed* and developing countries — 1978



*Including CPEs

PEI

OPEC Statistics At A Glance

(Continued)

Crude oil cost to consumers in real terms — 1972 U.S.$

	1972	1973	1974	1975	1976	1977	1978	1979 3rd quarter
Official price of Arabian Light (U.S.$/bbl)	1.90	2.22	9.74	10.72	11.51	12.70	12.70	18.00
Japan	1.90	1.67	6.05	6.59	6.70	6.33	4.89	7.13
Germany	1.90	1.74	6.55	6.54	7.24	6.67	5.63	7.07
France	1.90	1.71	6.28	6.50	7.27	7.74	6.48	7.90
UK	1.90	2.11	7.88	7.37	8.50	7.67	6.45	7.10
Italy	1.90	1.90	6.61	6.71	7.48	7.29	6.37	7.61
Netherlands	1.90	1.72	6.38	6.01*	7.09	6.72	5.79	7.54

*Based on first three quarters

In 1979 OPEC official crude oil price increases added only 0.93% of the overall inflation in the major industrialized economies.

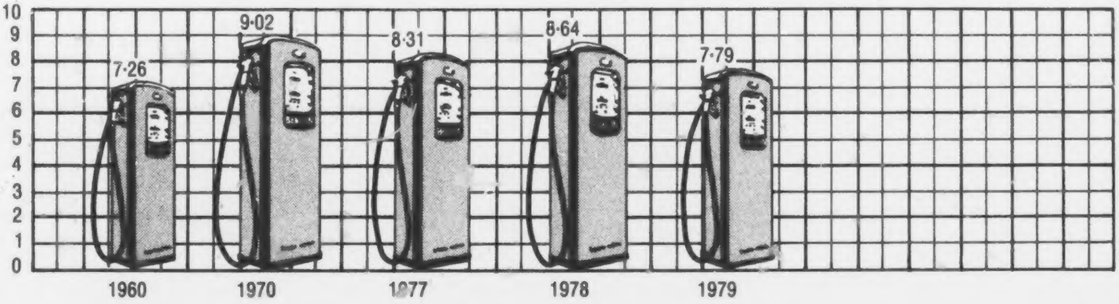
Gold and silver as compared to Arabian Light

		1960	1970	1977	1978	1979
Arabian Light	Average price (U.S.$/bbi)	1.73	1.67	12.40	12.70	17.28
	Index	100.00	96.53	716.76	734.10	998.84
Gold	Price (U.S.$/fine ounce)*	35.28	35.98	147.72	193.24	307.10
	Index	100.00	101.98	418.71	547.73	870.46
	How many fine gold ounces could be purchased for one barrel?	0.05	0.05	0.08	0.07	0.06
Silver	Price (U.S.$/troy ounce)**	0.091	1.77	4.62	5.40	11.05
	Index	100.00	193.76	505.80	590.91	1,214.29
	How many troy ounces of silver could be purchased for one barrel?	1.90	0.94	2.68	2.35	1.56

* London

** New York

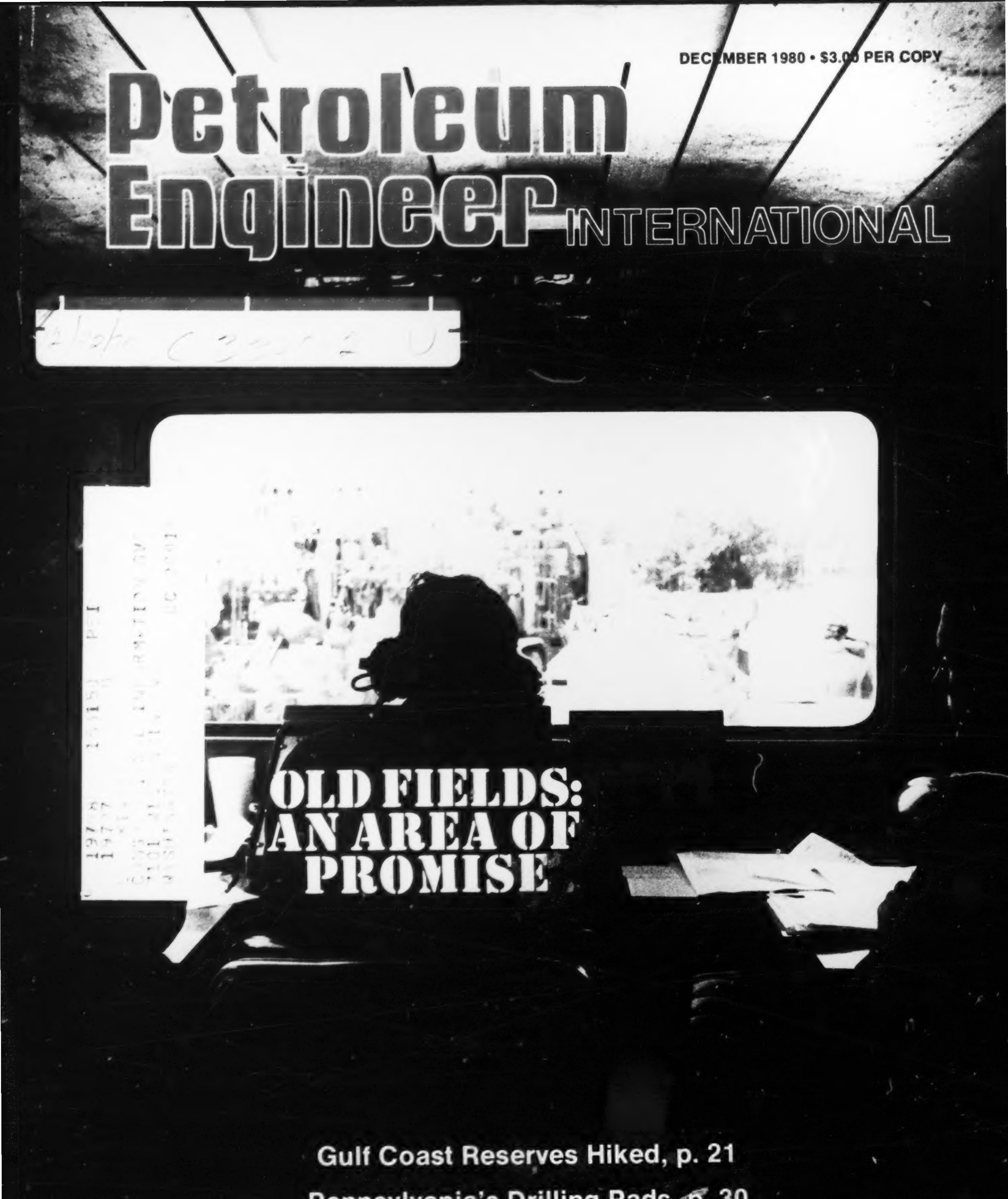
Comparison of hourly wages and gasoline prices in the U.S. (gal/hr worked)



Taken from Facts & Figures, A Comparative Analysis, *Organization of the Petroleum Exporting Countries (June 1980) 11,12,13,19,20,21.*

DECEMBER 1980 • $3.00 PER COPY

Petroleum Engineer INTERNATIONAL



OLD FIELDS: AN AREA OF PROMISE

Gulf Coast Reserves Hiked, p. 21

Pennsylvania's Drilling Pads, p. 30

Massive Fracs With Foam, p. 24

Calculators Aid Optimized Drilling—Part 3, p. 52

THE INTERNATIONAL MAGAZINE OF METHODS FOR ENGINEERING/OPERATING PEOPLE

Drilling Continues At Record Pace

With drilling activity in the U.S. increasing at a rate that already is stretching the limits of the accompanying graph, chances are good that the annual average of rotary rig activity will top 2,900 this year for the first time ever.

This would be almost 215 rigs above the previous high of 2,686, set back in 1955.

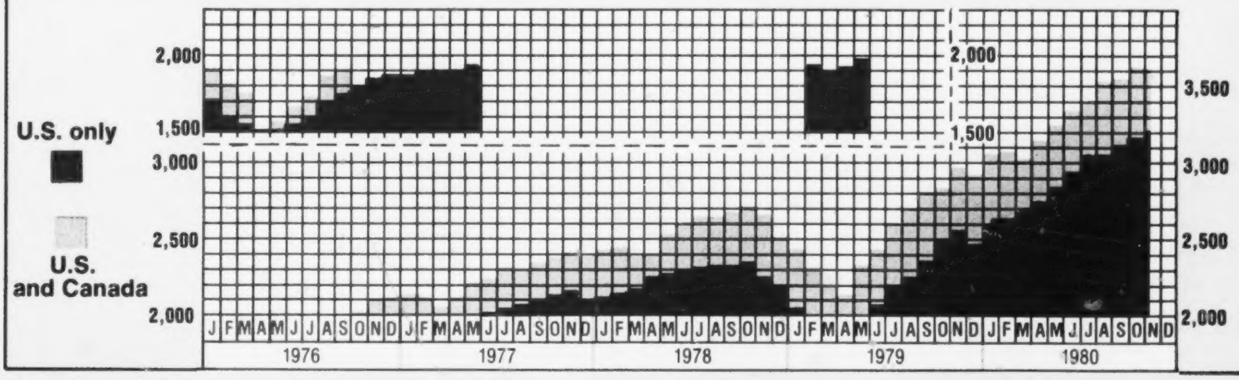
The weekly average this year has been ahead of the 1955 mark since mid-June, and the average count for the second half of 1980 has been 3,088 rigs turning each week.

Canadian activity also is setting records, but they may be short-lived in the face of Ottawa's apparent energy death wish. Some observers are of the opinion that Canada's new energy proposals indicate the country has given up on its goal of energy independence by 1990.

Rotary Rigs Actually Making Hole In United States & Canada

As Reported to International Association of Drilling Contractors by Hughes Tool Company

	Oct. 20, 1980	Oct. 27, 1980	Nov. 3, 1980	Nov. 10, 1980
Alabama	14	15	14	13
Alaska				
Land	9	8	12	13
Offshore	1	1	1	2
Arkansas	30	32	33	31
Arizona	2	2	3	2
California				
Land	109	103	105	106
Offshore	18	19	19	21
Total	127	122	124	127
Colorado	81	76	75	72
Florida	4	4	4	4
Hawaii	1	1	1	1
Idaho	1	1	1	1
Illinois	30	24	24	24
Kansas	153	145	147	148
Kentucky	2	2	3	3
North Louisiana	59	60	58	56
South Louisiana				
Inland Waters	82	80	79	73
Land	170	178	168	170
Offshore	135	136	146	150
Total	446	454	451	449
Michigan	31	34	33	30
Mississippi	56	51	55	58
Montana	57	58	68	50
Nebraska	13	17	16	21
Nevada	7	6	6	5
New Mexico	119	122	120	124
New York	6	7	7	8
North Dakota	83	86	79	85
Ohio	89	90	84	83
North Dakota	83	86	79	85
Ohio	89	90	84	83
Oklahoma	441	449	454	462
Oregon	1	1	1	1
Pennsylvania	37	37	38	38
Rhode Island—				
Offshore	2	2	2	2
South Dakota	2	2	2	2
Tennessee	1	1	1	1
Texas—				
Offshore	70	72	72	75
Dist. 1	38	40	42	45
Dist. 2	56	60	60	58
Dist. 3	179	188	189	182
Dist. 4	104	103	99	103
Dist. 5 & 6	126	125	124	126
Dist. 7B	91	98	97	95
Dist. 7C	67	72	74	78
Dist. 8	120	112	126	117
Dist. 8A	77	75	76	78
Dist. 9	66	74	74	72
Dist. 10	55	60	61	53
Total	1049	1079	1094	1082
Utah	54	51	54	55
Virginia	2	2	2	2
Washington	1	1	1	1
West Virginia	46	43	42	35
Wyoming	166	163	158	174
Total U.S.	3164	3189	3210	3209
Western Canada	410	426	417	411
Eastern Canada	8	8	8	2
U.S. and Canada	3582	3623	3635	3622



PETROLEUM ENGINEER INTERNATIONAL • 800 Davis Building • Dallas, Texas 75202 • **TWX** 910-861-9306

Abbott Sparks	President
John G. Grant	Publisher and Vice President
W. B. Bleakley	Editor
Richard D. McNally	Associate Editor
Steven D. Moore	Technical Editor
Mary Jane Ellis	Assistant Editor
Laura Jacobus	Assistant Editor
Edna Taylor	Editorial Assistant
J. E. (Hank) Kastrop	Consulting Editor
Renn Rothrock, Jr.	Consulting Editor
Ernestine Adams	Editor, Energy Management Rpt.
Julie Fonner	EMR Assistant Editor
Gregory Martin	Editor, Energy News/Energy Week
Sharon Hutcheson	Editorial Assistant

•

Alan Hilton	Service R&D Manager
Denise Tevis	Service R&D Department
Diane Mosman	Reader Service

•

ADVERTISING SALES OFFICES

EASTERN: Richard Martin, P.O. Box 89, Tennent, New Jersey 07763, (201) 446-3230

CHICAGO 60646: Bill Facinelli, Dwain Holmgren 4761 West Touhy Ave., Lincolnwood, Illinois, (312) 679-1100

OHIO, WESTERN PA.: Dwain Holmgren, 4761 West Touhy Avenue, Lincolnwood, Illinois (312) 679-1100

LOS ANGELES 91106: Bruce Berkey, 61 S. Lake Ave., Box 4566, Pasadena, Calif., (213) 681-0685.

HOUSTON 77027: Jess Adkins, Vice Pres., Gulf Coast Regional Manager, **Barry Biklen, Hal Odum,** 4151 Southwest Freeway, Suite 115, (713) 626-7850

DALLAS 75202: Ed Sealey, 800 Davis Bldg., (214) 748-4403, TWX 910-861-9306

WEST TEXAS: Rusty Meador, P.O. Box 611, Eldorado, Texas 76936 (915) 853-2689

UNITED KINGDOM, NETHERLANDS, SCANDINAVIA: Bryan Clark, Energy Publications, Div. HBJ, 24/28 Oval Road, London NW1 7DX, England, (01) 485-7074 (OR 7075). Cable: HARBREX, London NW1; Telex: 25775

FRANCE, ITALY, BELGIUM, SWITZERLAND: Gerard Lasfargues, 32, rue Desbordes Valmore, 75016-Paris, France. Telephone: 504 97 94

JAPAN: Mashy Yoshikawa, Orient Echo, Inc., 11th Floor Sankyo Bldg., 7-12 Tsukiji 2-chome, Chuo-ku, Tokyo, Telephone: 541-4923, Cable: MYORIENTECHO

GERMANY, AUSTRIA: S.I.P.A.S., **Wim. J. M. Sanders, Paul J. Verbunt,** Raadhuisstraat 24, P.O. Box 25, 1484 EN Graft-de Ryp, Holland, Telephone 02997-1303 and 3660. Telex: 13039 sipas nl, Telegrams: SIPAS-Amsterdam

Jane Dietz	Production Department Manager
Don Fickert	Graphics Director
Janell Fowler	Production Manager
Debbie Cooper	Production Coordinator
Dennis Howard	Presentation
James Duke	Presentation
Victoria Valentin	Presentation
Laura Page	Presentation

•

Gary Hogan	Business Manager
Jack Schabel	Circulation Director
Royal Courtney	Circulation Fulfillment Manager
Gary Rothell	Classified Advertising Manager

ENERGY PUBLICATIONS
• a Division of Harcourt Brace Jovanovich •
P.O. BOX 1589 • 800 DAVIS BUILDING
DALLAS, TEXAS 75221 • (214) 748-4403

PETROLEUM ENGINEER INTERNATIONAL
Pipeline & Gas Journal
Energy Management Report
Energy News • Energy Week

EDITORIAL ADVISORY COMMITTEE
Lloyd E. Elkins, Petroleum Consultant
Bennie L. Franks, President, Sun Texas Co.
Dennis E. O'Brien, Technology Section Head, Exxon Chemical Company
B. R. Jones, President, Eagle Production and Drilling Co.
Frank Schuh, Director of Engineering Development, ARCO Oil and Gas Co., a Division of Atlantic Richfield Co.
Marius J. Mes, Senior Research Scientist, Production Research Department, Conoco Inc.

PETROLEUM ENGINEER INTERNATIONAL (USPS 429-380) published 15 times each year, monthly plus March 15, July 15 and November 15, by Energy Publications Division, Harcourt Brace Jovanovich, P.O. Box 1589, Dallas, Texas 75221.

December, 1980, Volume 52, No. 15.Copyright© 1980 by Harcourt Brace Jovanovich, Inc. All rights reserved. No part of this publication may be transmitted or reproduced in any form or by any means, electronic or mechanical, including photocopy, recording, or any information storage and retrieval system, without permission in writing from the publisher.

Subscription rate to personnel employed by companies involved with exploration, drilling, production, or field processing of oil or gas: one year $12.00, two years $18.00, three years $24.00 for North, Central, and South America. Outside North, Central, and South America: one year $25.00, two years $35.00, three years $45.00. Subscription rate for all others: $25.00 for one year. Single copy price $3.00. Entered as second class mail matter January 15, 1949, at the post office in Dallas, Texas, under the act of March 3, 1879. Microfilm copies are available through University Microfilms, Inc., 313 North First Street, Ann Arbor, Michigan. Indexed by Applied Science, Technology Index and the Engineering Index, Inc.

HBJ A HARCOURT BRACE JOVANOVICH PUBLICATION ☆ABP ABC

Postmaster: Send address changes to PETROLEUM ENGINEER INTERNATIONAL, P.O. Box 1589, Dallas, Texas 75221, USA.

HARCOURT BRACE JOVANOVICH PUBLICATIONS

ROBERT L. EDGELL, Chairman; RICHARD MOELLER, President; LARS FLADMARK, Executive Vice President; ARLAND HIRMAN, Treasurer; JOE BILDERBACH, Vice President; JAMES GHERNA, Vice President; GEORGE GLENN, Vice President; THOMAS GREN Y, Vice President; EZRA PINCUS, Vice President; HARRY RAMALEY, Vice President; LOIS SANDERS, Vice President; ABBOTT SPARKS, Vice President. OFFICES: 757 Third Avenue, New York, N.Y. 10017. Phone: (212) 888-4444; 1 East First Street, Duluth, Minnesota 55802. Phone (218) 727-8511. 111 East Wacker Drive, Suite 1730, Chicago, Ill. 60601. Phone (312) 938-2300.

Petroleum Engineer® INTERNATIONAL

The international magazine of methods for engineering/operating people

DECEMBER 1980 NUMBER 15 VOLUME 52

ABOUT THE COVER: Control-van view of a massive hydraulic fracturing operation in East Texas is used through courtesy of Halliburton Services.

NEXT MONTH: Development drilling is accounting for more than 75% of the wells being completed in the U.S. this year, and that will be the topic of our January issue.

OLD FIELDS: AN AREA OF PROMISE

Amoco Hikes Production, Reserves In Texas Gulf Coast Fields 21
by W. B. Bleakley, Editor

Mitchell Energy Foam Fracs Tight Gas Zones 24
by W. B. Bleakley, Editor

Central Treating Location Solves Logistics And Environmental Problems 30
by D. Coleman and D. Miller, Red Valley Enterprises, and H. W. Bonner, Dowell

Silica Flour — Mechanism for Improving Cementing Compositions 43
A report from the User Subcommittee, API Standardization Committee 10

Hand-Held Calculators Augment Optimized Drilling Programs — Part 3 52
by Ben Siegel, Delta Drilling

Modern Production Risers — Part 3 66
by George W. Morgan, Engineering Consultant

George Williams Discusses UKOOA And North Sea Operations 80
Interview with the director-general of the UK Offshore Operators Association

Foamed Acid Stimulation Of Old Wells 96
by William G. F. Ford, Halliburton Services

Petroleum Engineering Quiz 104
Guest professor is Chapman Cronquist, Consultant

EDITORIAL DEPARTMENTS

News Hi-lites 1
Significant Happenings in Petroleum
Course of Oil 6
It's Sunday Night
Technology Trends 8
Forecasts from Current Events
Offshore Technology 10
DSDP Studies North Atlantic
Continuous Tables 105
Company News 109
Drilling/Exploration 114
Canada's East Coast Potential
Industry Meeting Calendar 122
Petroleum Profiles 124
Five Minutes with Bennie Franks
Professional Directory 128
Classified Advertising 131
Index to Advertisers EM 12

ENERGY *management report*™

by Ernestine Adams

EM
Comment 1
Energy World Report 2
Profits Outpace Revenue Gains 4
Financial Notebook 7
New Products 9

Profits Outpace Revenue Gains

Though third-quarter earnings of 77 oil firms rose less than the rate of inflation compared to same 1979 quarter, nine-month earnings rose 41% — more than revenues rose. Profit edged up to 6.1¢ of each dollar of sales for the total group, compared to 5.9¢ in same 1979 period.

Higher oil/gas prices led to greater profits from production. Most majors reported lower chemical earnings in third quarter, linked to recessionary drop in demand. Refining/marketing operations were equally sluggish.

Both production and marketing income rose for Shell Oil, though chemical sales fell. Petroleum product sales fell 18% for Atlantic Richfield but total earnings rose 52% over same 1979 period as North Slope oil output increased. Higher prices and greater Alaskan oil output were credited for Sohio's earnings rise.

Higher worldwide prices were responsible for Standard Indiana's income gain, though lower product sales margins hurt overseas earnings.

Price increases for Texaco's U.S. oil/gas output offset lower demand for oil products and petrochemicals. Texaco had 9.3% return on average total assets.

Revenues more than doubled and income rose 50% for Getty Oil, which cited higher prices as primary factor. Nine-month earnings rose 15% for Gulf Oil though third-quarter earnings fell due to reduced product sales and lower margins. Gulf had 13.2% return on average capital invested in 12-month period compared to 12.1% in 1979.

Estimated foreign inventory profits of nearly $500 million were included in Mobil's nine-month earnings. Worldwide income was 4.6% of revenues, 6.4¢ per gallon sold; U.S. income was 4.8¢ per gallon sold.

Higher oil/gas prices more than offset lower results in refining, marketing and chemicals for Phillips Petroleum, which had 11.4% return on average capital invested. Petroleum earnings in third quarter for Standard California were 5.6% of revenues, 4.5¢ per gallon sold.

Conoco attributed third quarter earnings decline mainly to foreign operations and slumping chemical sales but year-to-date totals were better than in 1979. Conoco's net income was 5¢ on each dollar of sales.

Net income fell for American Petrofina due to lower chemical profits, though income from oil/gas production was sharply higher. Product sales rose for Clark Oil & Refining.

Union Oil of California had better chemical earnings and oil/gas production earnings, though refining/marketing margins narrowed. Pennzoil cited higher prices for oil/gas, metals and sulfur. Lower demand and margins hurt marketing income.

Higher oil/gas prices were key factor for such independents as Superior Oil, Consolidated Oil & Gas, Mitchell Energy, Patton Oil. Higher gas prices in particular ($2.80 to $3.00/Mcf for new gas) helped Amarex and Argonaut Energy.

Gas companies reported the usual slump in third quarter earnings but 12-month earnings rose 21%. Non-utility operations, especially oil/gas production, continued to be a key factor.

Liquid fuels were biggest contributor to InterNorth's 12-month income gain. Higher prices and greater sales spurred production

THIRD QUARTER NATURAL GAS COMPANIES FINANCIAL REPORTS

	Three months ending September 30**						Twelve months ending September 30**						Profit Margin‡	
	Revenues ($000)			Earnings* ($000)			Revenues ($000)			Earnings* ($000)				
Company	1980	1979	% Chg.	1980	1979	% Chg.	1980	1979	% Chg.	1980	1979	% Chg.	1980	1979
American Natural Resources	502,176	480,600	+ 4.5	(15,349)	(15,106)		2,866,153	2,301,751	+ 24.5	116,304	78,832	+ 47.5	4.1	3.4
Arkla Gas	205,914	178,430	+ 15.4	8,840	11,260	- 21.5	930,833	663,843	+ 40.2	75,900	61,583	+ 23.2	8.2	9.3
Coastal Corp.	1,170,402	1,009,656	+ 15.9	25,622	26,881	- 4.7	3,733,293[1]	2,967,484[1]	+ 25.8	80,603[1]	73,338[1]	+ 9.9	2.2	2.5
Columbia Gas	557,405	454,129	+ 22.7	(4,030)	(4,217)		3,472,017	2,635,393	+ 31.7	151,527	132,277	+ 14.6	4.4	5.0
Commonwealth Nat. Res.	39,214	31,094	+ 26.1	447	606	- 26.2	197,445	139,409	+ 41.6	5,973	4,825	+ 23.8	3.0	3.5
Consolidated Nat. Gas	333,244	308,598	+ 8.0	(9,508)	(995)		2,392,066	1,850,898	+ 29.2	109,405	110,118	- 0.7	4.6	6.0
El Paso Companies	882,164	832,025	+ 6.0	8,732	38,475	- 77.3	2,835,092	2,182,597	+ 29.9	49,611	110,487	- 55.1	1.7	5.1
Enserch Corp.	687,768	572,387	+ 20.2	33,613	19,664	+ 70.9	2,000,199[1]	1,640,417[1]	+ 21.9	112,700[1]	69,901[1]	+ 61.2	5.6	4.3
Equitable Gas	256,185[1]	201,502[1]	+ 27.1	24,975[1]	19,506[1]	+ 28.0	338,701	256,724	+ 31.9	32,538	23,786	+ 36.8	9.6	9.3
Houston Nat. Gas[2]							2,357,871	1,797,835	+ 31.2	196,190	136,111	+ 44.1	8.3	7.6
InterNorth	587,983	514,885	+ 14.2	14,257	19,581	- 27.2	2,905,938	2,262,271	+ 28.5	222,196	170,152	+ 30.6	7.6	7.5
Mountain Fuel Supply	67,903	58,708	+ 15.7	40	559	- 92.8	391,048	314,158	+ 24.5	31,491	20,899	+ 50.7	8.1	6.7
Northwest Energy	212,035	214,873	- 1.3	6,462	7,789	- 17.0	1,312,211	997,974	+ 31.5	49,995	39,122	+ 27.8	3.8	3.9
Oklahoma Nat. Gas	200,347	138,780	+ 44.4	5,636	3,797	+ 48.4	883,332	687,974	+ 28.4	41,168	31,196	+ 32.0	4.7	4.5
Pacific Lighting	824,805	527,073	+ 56.5	20,511	25,824	- 20.6	3,154,440	2,016,462	+ 56.4	80,185	93,096	- 13.9	2.5	4.6
Panhandle Eastern	546,623	466,607	+ 17.1	43,972	39,209	+ 12.1	1,754,091	1,417,950	+ 23.7	142,691	124,266	+ 14.8	8.1	8.8
Peoples Energy	516,399	476,042	+ 8.5	5,948	9,645	- 38.3	3,016,237	2,441,556	+ 22.5	137,564	140,228	- 1.9	4.7	5.7
Pioneer Corp.	234,666	206,083	+ 13.9	20,774	20,134	+ 3.2	880,184	660,266	+ 33.3	83,610	53,295	+ 56.9	9.5	8.1
Southern Nat. Res.	376,264	350,735	+ 7.3	36,304	26,007	+ 39.6	1,760,992	1,367,032	+ 28.8	130,019	108,782	+ 19.5	7.4	8.0
Southern Union Co.	203,887	169,998	+ 19.9	2,517	4,486	- 43.9	875,332	672,704	+ 30.1	38,783	28,112	+ 38.0	4.4	4.2
Texas Eastern Corp.	972,934	725,968	+ 34.0	44,118	40,643	+ 8.6	3,985,522	2,650,222	+ 50.4	207,076	166,103	+ 24.7	5.2	6.3
Texas Gas Trans.	504,564	401,177	+ 25.8	18,814	17,295	+ 8.8	2,099,425	1,532,142	+ 37.0	88,741	69,314	+ 28.0	4.2	4.5
Transco Companies	620,603	368,000	+ 68.6	25,191	14,428	+ 74.6	2,277,108	1,343,034	+ 69.5	103,161	59,242	+ 74.1	4.5	4.4
United Energy Res.	1,057,726	840,419	+ 25.9	38,322	33,691	+ 13.7	3,979,697	2,679,626	+ 48.5	145,500	100,260	+ 45.1	3.7	3.7
Westcoast Trans.							843,100[1]	722,800[1]	+ 16.6	37,400[1]	36,900[1]	+ 1.4	4.4	5.1
TOTALS	11,561,211	9,527,769	+ 21.3	356,208	359,162	- 1.8	51,242,327	38,202,522	+ 34.1	2,470,331	2,042,225	+ 21.0	4.8	5.3

**Excluding non-recurring items. *Earnings available to common stock. ‡Earnings /Revenue = Profit Margin. ()Loss. [1]Nine months. [2]Ends July 31.

income of Oklahoma Natural Gas, which plans to change its name to Oneok (One-oak).

Contract drilling operations were main cause of higher income for Southern Natural Resources. Regulated utility income fell for Equitable Gas but was offset by higher oil/gas and ethane sales.

Higher gas processing income due to greater margins keyed 12-month gain for Southern Union. Utility earnings fell due to lower volumes.

Pacific Lighting blamed lower utility earnings on regulatory lag and lack of gas rate increases.

Greater interstate and intrastate gas sales boosted income of United Energy Resources. Record earnings for Texas Gas Transmission were due to pipelining and inland waterways operations.

Consolidated Natural Gas expects earnings decline for full year as industrial sales have slumped due to recession. Both Consolidated and El Paso say earnings have been hurt by cutoff of LNG supplies from Algeria. Travis Petty, El Paso chairman/president, says the firm may have to write off $375 million in the "unlikely event" that the LNG project must be halted due to gas pricing disagreement.

Higher purchased gas costs, lower industrial sales made earnings fall in third quarter for Commonwealth Natural Resources, which has agreed to merge with Columbia Gas System.

THIRD QUARTER OIL COMPANY FINANCIAL REPORTS

		Three months ending September 30**						Nine months ending September 30**						Profit Margin‡	
		Revenues ($000)			Earnings* ($000)			Revenues ($000)			Earnings* ($000)				
	Company	1980	1979	% Chg.	1980	1979	% Chg.	1980	1979	% Chg.	1980	1979	% Chg.	1980	1979
1.	Adams Resources & Energy	52,651	50,900	+ 3.4	(20)	22		172,356	124,450	+ 38.5	(60)	36			1.5
2.	Adobe Oil	36,593	24,942	+ 46.7	5,104	3,198	+ 59.6	111,368	62,737	+ 77.5	14,441	8,218	+ 75.7	13.0	13.1
3.	Amerada Hess	1,715,992	1,572,393	+ 9.1	94,266	128,331	- 26.5	5,701,668	4,689,476	+ 21.6	433,639	388,219	+ 11.7	7.6	8.3
4.	American Petrofina	467,493	427,817	+ 9.3	28,431	37,883	- 25.0	1,485,014	1,129,678	+ 31.5	84,964	65,480	+ 29.8	5.7	5.8
5.	Argonaut Energy	903	588	+ 53.6	61	(93)		1,601	1,212	+ 32.1	71	(120)		4.4	
6.	Ashland Oil	2,213,530	1,966,342	+ 12.6	36,225	52,841	- 31.4	6,375,182	5,255,452	+ 21.3	120,410	127,939	- 5.9	1.9	2.4
7.	Atlantic Richfield	5,636,821	4,378,637	+ 28.7	389,711	320,363	+ 21.6	16,765,447	11,627,060	+ 44.2	1,253,144	822,936	+ 52.3	7.5	7.1
8.	Belco Petroleum	203,428	185,807	+ 9.5	18,239	22,930	- 20.5	614,608	441,057	+ 39.5	55,243	54,136	+ 2.0	9.0	12.3
9.	Centura Energy[4]	2,637	2,083	+ 26.6	(135)	(120)									
10.	Cities Service	1,635,400	1,601,600	+ 2.1	92,600	86,100	+ 7.5	5,621,700	4,472,500	+ 25.7	369,700	241,300	+ 53.2	6.6	5.4
11.	Clark O&R	423,452	308,064	+ 37.5	14,250	12,959	+ 10.0	1,256,893	842,998	+ 49.1	39,596	28,488	+ 39.0	3.2	3.4
12.	Commonwealth OR	341,600	332,200	+ 2.8	(6,800)	23,200		945,800	889,300	+ 6.4	(30,000)	71,300			8.0
13.	Consolidated O&G	8,244	9,734	- 15.3	1,172	57	+1956.1	24,252	24,152	+ 0.4	882	(816)		3.6	
14.	Conoco	4,500,000	3,400,000	+ 32.4	207,400	247,100	- 16.1	13,500,000	9,300,000	+ 45.2	785,600	624,700	+ 25.8	5.8	6.7
15.	Crystal Oil	70,213	46,099	+ 52.3	5,300	2,516	+110.7	189,025	111,313	+ 69.8	10,481	6,081	+ 72.3	5.5	5.5
16.	Delhi Int'l Oil	7,257	5,025	+ 44.4	1,767	1,332	+ 32.7	19,739	12,275	+ 60.8	4,319	2,712	+ 59.3	21.9	22.1
17.	Diamond Shamrock	773,159	606,247	+ 27.5	42,696	37,122	+ 15.0	2,297,620	1,685,477	+ 36.3	155,297	119,616	+ 29.8	6.8	7.1
18.	Dorchester Gas[6]	154,842	125,399	+ 23.5	9,704	10,014	- 3.1	608,760[1]	368,267[1]	+ 65.3	34,919[1]	25,152[1]	+ 38.8	5.7	6.8
19.	Dyco Petroleum	8,071	6,330	+ 27.5	2,058	1,493	+ 37.8	21,033	14,936	+ 40.8	5,588	3,276	+ 70.6	26.7	21.9
20.	Earth Resources	327,368	134,747	+ 76.1	12,850	6,514	+ 97.3	468,336	226,201	+107.0	20,874	11,124	+ 87.6	4.5	4.9
21.	Energy Reserves Group	37,473	28,005	+ 33.8	2,757	2,284	+ 20.7	110,682	68,601	+ 61.3	16,375	10,218	+ 60.3	14.8	14.9
22.	Equity Oil	4,993	2,982	+ 67.4	1,248	850	+ 46.8	11,962	8,433	+ 41.8	3,037	2,018	+ 50.5	25.4	23.9
23.	Exxon	26,745,000	21,681,000	+ 23.4	1,355,000	1,145,000	+ 18.3	80,622,000	59,148,000	+ 36.3	4,310,000	2,930,000	+ 47.1	5.3	5.0
24.	Felmont	15,335	10,834	+ 41.5	3,764	2,252	+ 67.1	42,223	30,021	+ 40.6	11,714	6,524	+ 79.6	27.7	21.7
25.	Forest	22,414	17,328	+ 29.4	1,504	1,252	+ 20.1	65,741	49,342	+ 38.2	4,165	3,787	+ 10.0	6.0	8.0
26.	Galaxy Oil[6]	2,797	1,903	+ 47.0	98	(507)		5,590[2]	3,448[2]	+ 62.1	135[2]	(337)[2]		2.4	
27.	Getty Oil	2,558,560	1,329,297	+ 92.5	191,555	173,877	+ 10.2	7,470,577	3,574,213	+109.0	659,990	421,033	+ 56.8	8.8	11.8
28.	Gulf Oil Corp.	6,631,000	6,736,000	- 1.6	244,000	416,000	- 41.4	21,187,000	18,410,000	+ 15.1	1,003,000	956,000	+ 4.9	4.7	5.2
29.	Hudson Petroleum	3,095	1,938	+ 59.7	1,115	764	+ 45.9	8,492	4,477	+ 47.3	2,687	1,238	+ 53.9	31.6	27.6
30.	Holly Corp.[5]	99,939	79,388	+ 25.9	1,675	1,527	+ 9.7	197,253[2]	144,017[2]	+ 37.0	2,907[2]	3,227[2]	- 9.9	14.8	22.4
31.	Howell Corp.	64,277	125,297	- 48.7	424	10,318	- 96.0	203,309	252,301	- 19.4	10,949	21,032	- 47.9	5.4	8.3
32.	Howell Petroleum	5,912			1,019			14,919			1,966			13.2	
33.	Inexco Oil	39,689	27,752	+ 43.0	6,037	4,534	+ 33.1	107,386	73,498	+ 46.1	17,386	12,132	+ 43.3	16.2	16.5
34.	Juniper Petroleum	5,497	4,473	+ 22.9	595	621	- 4.2	11,283[2]	8,334[2]	+ 35.4	1,151[2]	937[2]	+ 22.8	10.2	11.2
35.	KRM Petroleum	1,047	952	+ 10.0	137	284	- 51.8	3,449	2,039	+ 69.2	712	313	+127.5	20.6	15.4
36.	Lear Petroleum	24,308	22,938	+ 6.0	947	1,767	- 46.4	89,855[1]	78,314[1]	+ 14.7	6,287[1]	5,007[1]	+ 25.6	7.0-	6.4
37.	Louisiana L&E	247,281	203,057	+ 21.8	37,510	37,691	+ 99.5	770,671	570,662	+ 35.0	131,935	124,731	+ 5.8	17.1	21.9
38.	Marion	95,175	72,777	+ 30.8	6,149	5,463	+ 12.6	232,428	169,888	+ 36.8	11,105	11,711	- 5.2	4.8	6.9
39.	Mapco Inc.	177,703	210,508	- 15.6	16,997	16,539	+ 2.8	615,152	552,354	+ 11.4	60,040	47,862	+ 25.4	9.8	8.7
40.	Marathon Oil	2,028,189	1,913,635	+ 6.0	76,347	79,656	- 4.2	6,333,450	4,979,235	+ 27.2	323,743	268,961	+ 20.4	5.1	5.4
41.	McRae Consolidated[3]	28,115	26,688	+ 5.3	1,407	1,767	- 20.3	90,224	66,014	+ 36.5	8,989	3,511	+156.0	9.9	5.3
42.	Mesa Petroleum	78,697	69,318	+ 13.5	15,324	12,172	+ 25.9	268,802	182,004	+ 47.7	58,315	37,843	+ 54.1	21.7	20.8
43.	Mobil Corp.	15,662,618	12,366,784	+ 26.7	720,999	601,597	+ 19.8	46,337,781	33,476,994	+ 38.4	2,254,459	1,468,942	+ 53.5	4.9	4.4
44.	Murphy Oil	455,615	452,235	+ 0.7	40,914	28,625	+ 42.9	1,479,698	1,179,021	+ 25.5	104,937	63,960	+ 64.1	7.1	5.4
45.	Natomas	348,428	259,369	+ 34.3	58,873	32,680	+ 80.1	1,032,111	726,805	+ 42.0	164,287	76,606	+144.5	15.9	10.5
45.	Noble Affiliates	70,466	54,736	+ 28.7	8,558	8,992	- 4.8	205,315	151,896	+ 35.2	34,107	21,871	+ 55.9	16.6	14.4
47.	Norris Oil	284	170	+ 67.1	20	(6)		835	347	+139.2	57	(127)		6.8	
48.	Occidental Petroleum	2,951,000	2,608,000	+ 13.2	126,000	146,000	- 13.7	9,296,500	6,688,200	+ 39.0	458,900	317,000	+ 73.2	5.9	4.7
49.	Ocean O&G	18,897	15,519	+ 21.8	3,601	2,856	+ 26.1	57,585	39,562	+ 45.6	11,199	5,824	+ 92.3	19.4	14.7
50.	Pacific Resources	214,490	158,178	+ 35.6	4,188	3,554	+ 17.8	601,433	381,753	+ 57.5	18,089	8,717	+107.5	3.0	2.3
51.	Pennzoil Co.	579,692	521,966	+ 11.1	68,649	59,978	+ 14.4	1,823,593	1,448,629	+ 25.9	227,692	161,781	+ 40.7	12.5	11.2
52.	Sabine Corp.	31,046	23,052	+ 34.7	6,281	3,397	+ 84.9	53,305	42,283	+ 26.1	11,785	4,199	+180.6	22.1	9.9
53.	Phillips Petroleum	3,224,120	2,496,015	+ 29.2	283,378	193,027	+ 46.8	9,838,461	6,699,961	+ 46.8	782,641	584,630	+ 33.9	8.0	8.7
54.	Quaker State	214,676	175,056	+ 22.6	5,937	7,950	- 25.3	610,427	513,147	+ 19.0	20,312	29,057	- 30.1	3.3	5.7
55.	Shell Oil	5,135,000	3,766,000	+ 36.4	353,000	293,000	+ 20.5	14,828,000	10,245,000	+ 44.7	1,133,000	794,000	+ 42.7	7.6	7.8
56.	Southland Royalty	94,109	67,552	+ 39.3	18,179	15,883	+ 14.5	277,080	180,381	+ 53.6	52,365	37,790	+ 38.6	18.9	2.1
57.	Standard California	10,508,822	8,137,459	+ 29.1	623,656	535,222	+ 16.5	31,605,370	22,070,037	+ 43.2	1,785,694	1,261,408	+ 41.6	5.6	5.7
58.	Standard Indiana	6,500,000	5,100,000	+ 27.5	448,900	437,700	+ 2.6	20,100,000	14,100,000	+ 42.6	1,513,100	1,137,900	+ 33.0	7.5	8.1
59.	Sundance Oil	4,500	3,441	+ 31.8	(1,498)	(2,557)		12,415	10,430	+ 19.0	(6,334)	(4,162)			
60.	Standard Ohio	2,542,700	2,097,800	+ 21.2	433,400	366,200	+ 18.4	8,042,000	5,566,300	+ 44.5	1,335,400	705,100	+ 89.4	16.6	12.7
61.	Sun Co.	3,000,000	2,700,000	+ 11.1	194,900	181,900	+ 7.2	9,100,000	7,600,000	+ 19.7	693,000	477,000	+ 45.3	7.6	6.3
62.	Superior Oil	376,070	304,640	+ 23.4	78,054	63,688	+ 22.6	1,056,975	782,769	+ 35.0	237,255	152,605	+ 55.5	22.4	19.5
63.	Texas American	33,073	30,967	+ 6.8	759	477	+ 59.1	99,289	80,293	+ 23.7	1,966	2,054	- 4.3	2.0	2.6
64.	Supron Energy	15,040	12,000	+ 25.3	4,362	3,386	+ 28.8	46,287	34,089	+ 35.8	13,687	9,658	+ 41.7	29.6	28.3
65.	Tenneco	3,068,000	2,789,000	+ 10.0	162,000	131,000	+ 23.7	9,585,000	7,940,000	+ 20.7	526,000	407,000	+ 29.2	5.5	5.1
66.	Texaco Inc.	12,625,000	10,222,200	+ 23.5	636,400	583,700	+ 9.0	38,411,200	27,083,300	+ 41.8	1,739,900	1,225,100	+ 42.0	4.5	4.5
67.	Texas International	25,494	9,007	+183.3	5,555	(5,005)		57,949	28,085	+106.3	12,015	(5,859)		20.7	
68.	Texas Oil & Gas[6]	324,293	256,425	+ 26.4	39,824	28,173	+ 41.3	628,149[2]	508,565[2]	+ 23.5	77,074[2]	54,040[2]	+ 42.6	12.2	10.6
69.	Tosco Corp.	574,173	574,142		9,321	23,589	- 60.1	1,706,599	1,373,052	+ 24.3	55,933	53,472	+ 4.6	3.3	3.9
70.	Total Petroleum N.A.	313,548	251,600	+ 24.6	12,534	9,124	+ 37.4	954,668	631,042	+ 51.3	35,432	18,445	+ 92.1	3.7	2.9
71.	Transcontinental Oil	19,615	15,879	+ 23.5	691	(1,035)		58,113	45,902	+ 26.6	2,116	(3,536)		3.6	
72.	Tribune Oil	447	358	+ 24.9	132	127	+ 3.9	1,383	892	+ 55.0	465	275	+ 69.1	33.6	30.8
73.	Union California	2,630,134	2,143,866	+ 22.7	122,012	105,953	+ 15.2	7,757,138	5,771,624	+ 34.4	469,751	348,299	+ 34.9	6.1	6.0
74.	United Refining	167,103	138,962	+ 20.3	1,551	6,305	- 75.4	482,737	352,568	+ 36.9	5,945	13,009	- 54.3	1.2	3.7
75.	Universal Resources[5]	8,584	6,153	+ 39.5	2,016	602	+234.9	27,497	17,581	+ 56.4	5,171	1,832	+182.3	18.8	10.4
76.	Williams Companies	519,849	442,183	+ 17.6	28,197	11,868	+137.6	1,573,697	1,389,913	+ 13.2	115,598	46,027	+151.2	7.3	3.3
77.	Woods Petroleum	14,072	11,041	+ 27.5	4,043	3,370	+ 20.0	38,920	31,321	+ 24.3	10,419	9,108	+ 14.4	26.8	29.1
	TOTALS	129,677,108	105,962,779	+ 22.6	7,425,875	6,789,192	+ 9.4	392,430,360	286,845,478	+ 36.8	23,909,113	16,950,550	+ 41.1	6.1	5.9

**Excluding non-recurring items. *Earnings available to common. ‡ Profit Margin=Earnings* ÷ Revenues. [1] Twelve months. [2] Six months. [3] Ends May 31. [4] Ends June 30. [5] Ends July 31. [6] Ends August 31.

NOTE

ONLY THE FOLLOWING PAGES OF THIS

PUBLICATION HAVE BEEN FILMED

Cover 1, p. 3-4, 21-24, 26,

EM 4, EM 7.

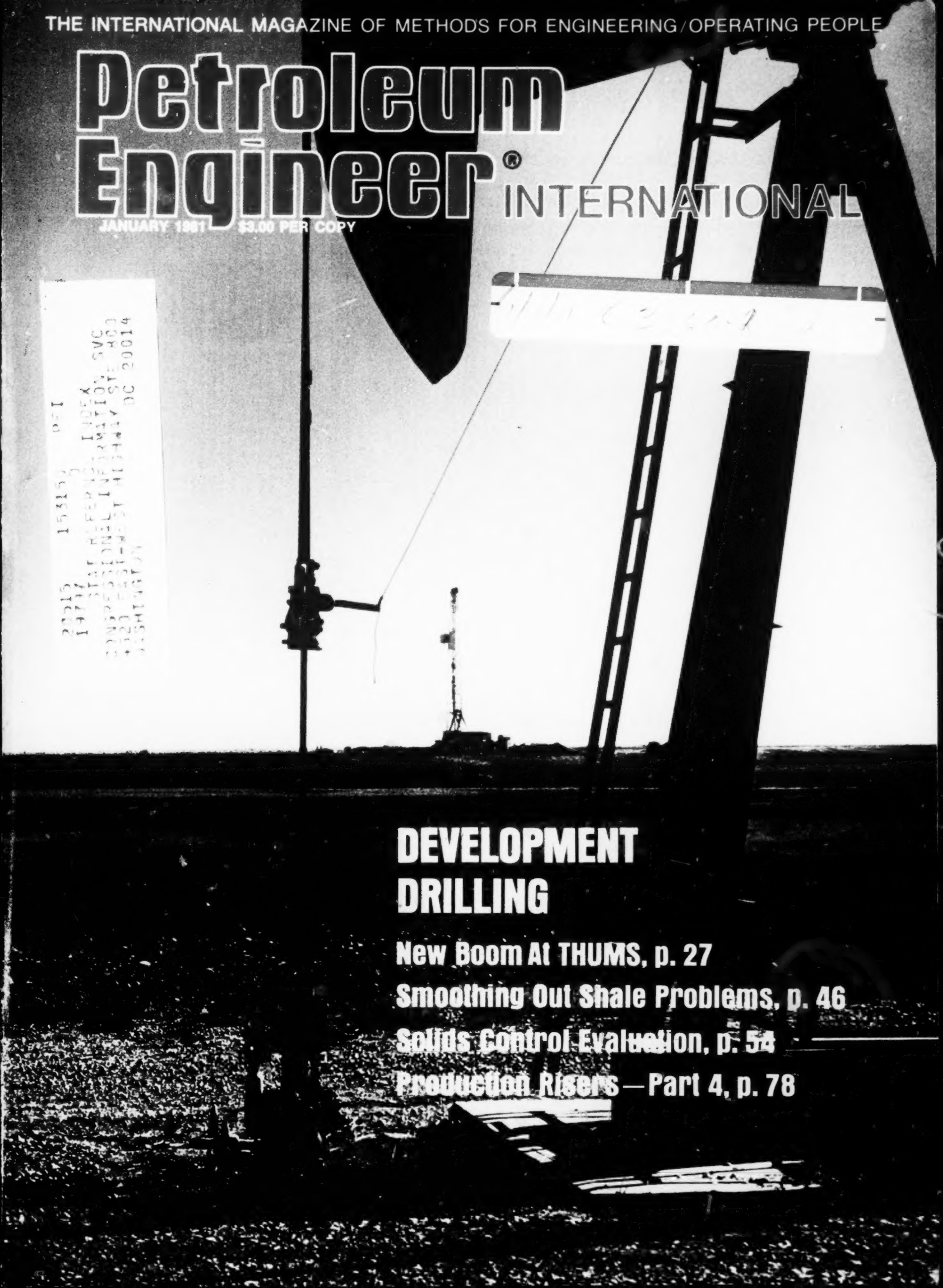
THE INTERNATIONAL MAGAZINE OF METHODS FOR ENGINEERING/OPERATING PEOPLE

Petroleum Engineer® INTERNATIONAL

JANUARY 1981 $3.00 PER COPY

20015 153150 PEI
14777 0
STAFF REFERENCE INDEX
CONGRESSIONAL INFORMATION SVC
4520 EAST-WEST HIGHWAY STE 800
WASHINGTON DC 20014

[illegible]



DEVELOPMENT DRILLING

New Boom At THUMS, p. 27

Smoothing Out Shale Problems, p. 46

Solids Control Evaluation, p. 54

Production Risers—Part 4, p. 78

Canadian Rigs Seen Moving South

Disenchantment with Canada's proposed new energy policy hasn't shown up in the accompanying chart yet, but indications are some 100 Canadian rigs will have moved south of the border by the end of this year.

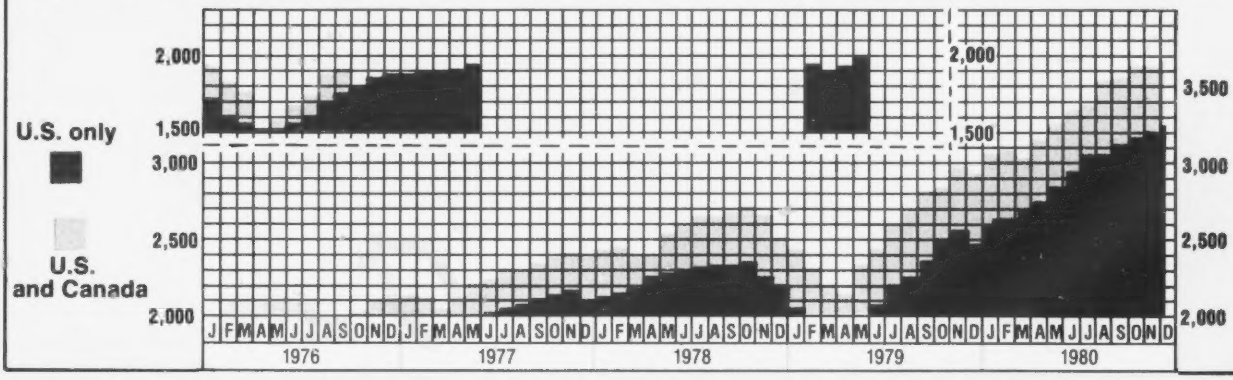
With the U.S. rig count on December 8 already close to 700 rigs higher than it was at the same time in 1979, the Canadian rigs probably will come in handy if the U.S.'s spectacular rise in drilling is to continue throughout this year.

What the slowdown in Canadian drilling and the government's attempted Canadiazation of the petroleum industry will do to the boom in western Canada, however, remains to be seen. Some observers feel the new energy proposals could be the straw that breaks the cigarette, and they look for Canada to eventually break up into three or four separate countries.

Rotary Rigs Actually Making Hole In United States & Canada

As Reported to International Association of Drilling Contractors by Hughes Tool Company

	Nov. 17, 1980	Nov. 24, 1980	Dec. 1, 1980	Dec. 8, 1980
Alabama	13	13	11	9
Alaska				
Land	7	18	17	23
Offshore	1	2	1	1
Arkansas	29	30	32	34
Arizona	2	2	1	1
California				
Land	106	102	102	109
Offshore	21	21	21	21
Total	127	123	123	130
Colorado	75	71	74	68
Florida	4	4	3	3
Georgia				
Offshore	0	2	1	1
Hawaii	1	1	1	0
Idaho	2	2	2	1
Illinois	21	19	18	19
Kansas	151	152	152	149
Kentucky	4	6	5	5
North Louisiana	54	54	54	52
South Louisiana				
Inland Waters	75	76	78	81
Land	171	165	164	165
Offshore	149	147	149	141
Total	449	442	445	439
Michigan	26	35	35	32
Mississippi	61	60	58	65
Montana	59	67	64	62
Nebraska	16	15	16	16
Nevada	5	6	6	6
New Mexico	121	125	115	121
New York	11	10	10	11
North Dakota	87	84	86	93
Ohio	87	90	90	90
Oklahoma	465	468	476	483
Oregon	1	1	1	1
Pennsylvania	35	34	34	33
Rhode Island				
Offshore	2	2	2	2
South Dakota	2	2	2	1
Tennessee	1	1	1	1
Texas				
Offshore	76	76	75	80
Dist. 1	42	44	43	50
Dist. 2	54	56	69	68
Dist. 3	183	182	179	176
Dist. 4	115	112	102	105
Dist. 5 & 6	125	123	123	124
Dist. 7B	89	87	79	78
Dist. 7C	80	79	83	86
Dist. 8	124	125	120	124
Dist. 8A	79	79	75	78
Dist. 9	73	74	70	70
Dist. 10	57	53	52	53
Total	1097	1090	1070	1092
Utah	57	59	53	63
Virginia	2	2	2	2
Washington State	1	1	1	1
West Virginia	35	31	36	37
Wyoming	174	161	165	167
Total U.S.	3231	3231	3209	3262
Western Canada	407	394	405	395
Eastern Canada	2	2	4	4
U.S. and Canada	3640	3627	3618	3661



PETROLEUM ENGINEER INTERNATIONAL • 800 Davis Building • Dallas, Texas 75202 • **TWX** 910-861-9306

Abbott Sparks	President
John G. Grant	Publisher and Vice President
W. B. Bleakley	Editor
Richard D. McNally	Associate Editor
Steven D. Moore	Technical Editor
Mary Jane Ellis	Assistant Editor
Laura Jacobus	Assistant Editor
Edna Taylor	Editorial Assistant
J. E. (Hank) Kastrop	Consulting Editor
Renn Rothrock, Jr.	Consulting Editor
Ernestine Adams	Editor, Energy Management Rpt.
Julie Fonner	EMR Assistant Editor
Gregory Martin	Editor, Energy News/Energy Week
Sharon Hutcheson	Editorial Assistant

•

Alan Hilton	Service R&D Manager
Denise Tevis	Service R&D Department

•

ADVERTISING SALES OFFICES

EASTERN: Richard Martin, P.O. Box 89, Tennent, New Jersey 07763, (201) 446-3230

CHICAGO 60646: Bill Facinelli, Dwain Holmgren 4761 West Touhy Ave., Lincolnwood, Illinois, (312) 679-1100

OHIO, WESTERN PA.: Dwain Holmgren, 4761 West Touhy Avenue, Lincolnwood, Illinois (312) 679-1100

LOS ANGELES 91106: Bruce Berkey, 61 S. Lake Ave., Box 4566, Pasadena, Calif., (213) 681-0685.

HOUSTON 77027: Jess Adkins, Vice Pres., Gulf Coast Regional Manager, **Barry Biklen, Hal Odum,** 4151 Southwest Freeway, Suite 115, (713) 626-7850

DALLAS 75202: Ed Sealey, 800 Davis Bldg., (214) 748-4403, TWX 910-861-9306

WEST TEXAS: Rusty Meador, P.O. Box 611, Eldorado, Texas 76936 (915) 853-2689

UNITED KINGDOM, NETHERLANDS, SCANDINAVIA: Bryan Clark, Energy Publications, Div. HBJ, 24/28 Oval Road, London NW1 7DX, England, (01) 485-7074 (OR 7075). Cable: HARBREX, London NW1; Telex: 25775

FRANCE, ITALY, BELGIUM, SWITZERLAND: Gerard Lasfargues, 32, rue Desbordes Valmore, 75016-Paris, France, Telephone: 504 97 94

JAPAN: Mashy Yoshikawa, Orient Echo, Inc., 11th Floor Sankyo Bldg., 7-12 Tsukiji 2-chome, Chuo-ku, Tokyo, Telephone: 541-4923, Cable: MYORIENTECHO

GERMANY, AUSTRIA: S.I.P.A.S., **Wm. J. M. Sanders, Paul J. Verbunt,** Raadhuisstraat 24, P.O. Box 25, 1484 EN Graft-de Ryp, Holland, Telephone 02997-1303 and 3660. Telex: 13039 sipas nl, Telegrams: SIPAS-Amsterdam

Jane Dietz	Production Department Manager
Don Fickert	Graphics Director
Janell Fowler	Production Manager
Debbie Cooper	Production Coordinator
Dennis Howard	Presentation
James Duke	Presentation
Victoria Valentin	Presentation
Laura Page	Presentation

•

Gary Hogan	Business Manager
Jack Schabel	Circulation Director
Royal Courtney	Circulation Fulfillment Manager

ENERGY PUBLICATIONS
• a Division of Harcourt Brace Jovanovich •
P.O. BOX 1589 • 800 DAVIS BUILDING
DALLAS, TEXAS 75221 • (214) 748-4403

PETROLEUM ENGINEER INTERNATIONAL
Pipeline & Gas Journal
Energy Management Report
Energy News • Energy Week

EDITORIAL ADVISORY COMMITTEE
Lloyd E. Elkins, Petroleum Consultant
Bennie L. Franks, President, Sun Texas Co.
Dennis E. O'Brien, Technology Section Head, Exxon Chemical Company
B. R. Jones, President, Eagle Production and Drilling Co.
Frank Schuh, Director of Engineering Development, ARCO Oil and Gas Co., a Division of Atlantic Richfield Co.
Marius J. Mes, Senior Research Scientist, Production Research Department, Conoco Inc.

PETROLEUM ENGINEER INTERNATIONAL (USPS 429-380) published 15 times each year, monthly plus March 15, July 15 and November 15, by Energy Publications Division, Harcourt Brace Jovanovich, P.O. Box 1589, Dallas, Texas 75221.

January, 1981, Volume 53, No. 1. Copyright© 1981 by Harcourt Brace Jovanovich, Inc. All rights reserved. No part of this publication may be transmitted or reproduced in any form or by any means, electronic or mechanical, including photocopy, recording, or any information storage and retrieval system, without permission in writing from the publisher. Subscription rate to personnel employed by companies involved with exploration, drilling, production, or field processing of oil or gas: one year $12.00, two years $18.00, three years $24.00 for North, Central, and South America. Outside North, Central, and South America: one year $25.00, two years $35.00, three years $45.00. Subscription rate for all others: $25.00 for one year. Single copy price $3.00. Entered as second class mail matter January 15, 1949, at the post office in Dallas, Texas, under the act of March 3, 1879. Microfilm copies are available through University Microfilms, Inc., 313 North First Street, Ann Arbor, Michigan. Indexed by Applied Science, Technology Index and the Engineering Index, Inc.

HBJ A HARCOURT BRACE JOVANOVICH PUBLICATION ☆ABP ABC

Postmaster: Send address changes to PETROLEUM ENGINEER INTERNATIONAL, P.O. Box 1589, Dallas, Texas 75221, USA.

HARCOURT BRACE JOVANOVICH PUBLICATIONS
ROBERT L. EDGELL, Chairman; RICHARD MOELLER, President; LARS FLADMARK, Executive Vice President; ARLAND HIRMAN, Treasurer; JOE BILDERBACH, Vice President; JAMES GHERNA, Vice President; GEORGE GLENN, Vice President; THOMAS GRENEY, Vice President; EZRA PINCUS, Vice President; HARRY RAMALEY, Vice President; ABBOTT SPARKS, Vice President. OFFICES: 757 Third Avenue, New York, N.Y. 10017. Phone (212) 888-4444; 1 East First Street, Duluth, Minnesota 55802. Phone (218) 727-8511. 111 East Wacker Drive, Suite 1730, Chicago, Ill. 60601. Phone (312) 938-2300.

Petroleum Engineer® INTERNATIONAL

The international magazine of methods for engineering/operating people

JANUARY 1981 NUMBER 1 VOLUME 53

DEVELOPMENT DRILLING

Developers Set Drilling Pace 21

by Rich McNally, Associate Editor

Development wells this year will exceed the annual total of wells drilled in the U.S. as recently as 1978.

New Boom At THUMS Island 27

by Steven D. Moore, Technical Editor

A fresh look at drilling and production operations brought out of obscurity by the new oil boom.

Elf Well Turns 90° — And Stays There 40

by B. Astier and A. Jourdan, Elf-Aquitaine, and G. Baron, Institut Francais du Pétrole

More than 330 ft of a 2,198-ft hole were drilled between 89° and 90° of inclination.

Smoothing Out Drilling Problems On High Island Block A561 46

By Steven D. Moore, Technical Editor

Solutions involve innovative cost-cutting programs and some old fashioned ingenuity.

Field Evaluation Of Solids Control Equipment 54

by Jeffrey W. Planck, Imco Services

A good solids control program should go hand-in-hand with a good drilling and mud program.

Newest Mobile Drilling Rig 74

Staff Report

Reportedly the largest such rig ever built, it is capable of drilling to 16,000 ft.

Modern Production Risers — Part 4 76

By George W. Morgan, Engineering Consultant

Multiline risers for deepwater SPMs must handle problems of increased wave activity.

Women Engineers Discuss Their Careers 90

by Mary Jane Ellis, Assistant Editor

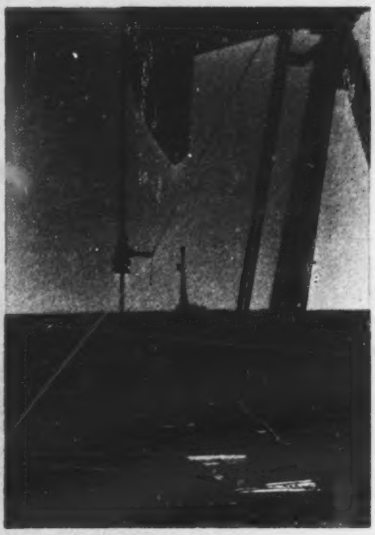
Once a novelty in oilfield operations, women engineers are appearing more frequently.

Petroleum Engineering Quiz 110

Guest professor is George V. Chillingar, University of Southern California

EDITORIAL DEPARTMENTS

News Hi-lites 1
Significant Happenings in Petroleum
Course of Oil 6
The Peanut Principle
Technology Trends 8
Forecasts From Current Events
Offshore Technology 10
Semisubmersible Tanker
Continuous Tables 111
Company News 116
Drilling/Exploration 122
North Burbank Test
Industry Meeting Calendar 130
Petroleum Profiles 132
Five Minutes with Jack Combes
Professional Directory 140
Oil & Gas Professional Opportunities EM 7
Index to Advertisers EM 16



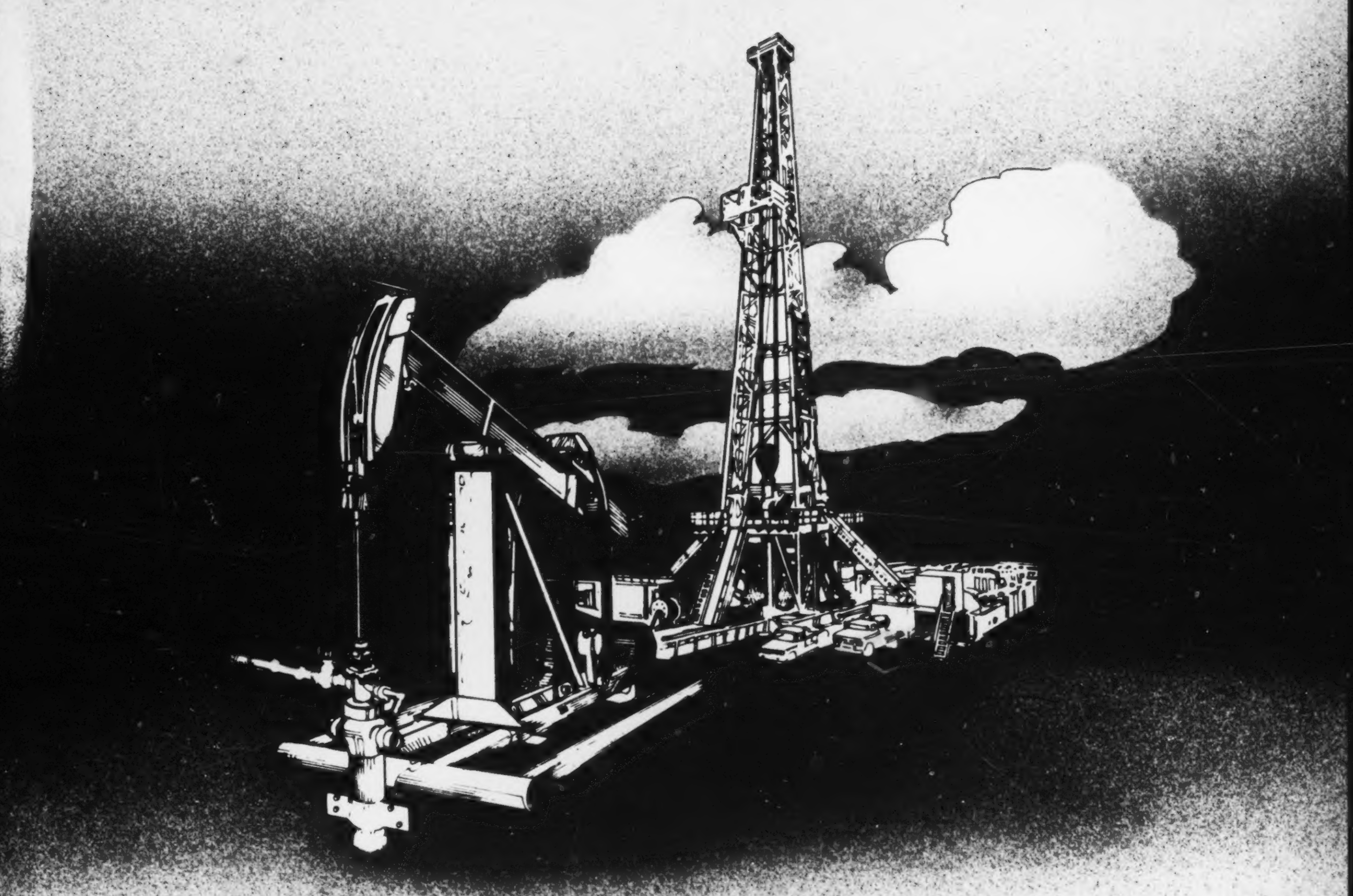
ABOUT THE COVER: Pumping unit frames development well being drilled for Standard Oil Co. (Indiana) in Colorado's Wattenberg field.

NEXT MONTH: The annual Offshore Forecast issue will cover some of the innovative technology that is helping the industry move into deeper and more hostile waters. In addition, the issue will contain the Offshore Rig Locator.

ENERGY management report™

by Ernestine Adams

Comment EM 1
Energy World Report EM 2
Governments Take 72% EM 4
Financial Notebook EM 5
Professional Opportunities EM 7
New Products EM 13



Developers Set Drilling Pace

by Rich McNally, *Associate Editor*

Development drilling, which has been on a steady rise in the U.S. ever since the Arab oil embargo, could account for as many as 80% of all completions this year as operators continue their attempt to turn around the country's production decline.

In the years just prior to the 1973 embargo, development drilling regularly accounted for approximately 69% of all wells. Since then, however, the percentage has risen steadily, and it stood at 78 for the first 3 quarters of 1980. Even at 75%, however, indications are that development wells this year will exceed the annual total of all wells drilled in the U.S. as recently as 1978, when 48,513 wells were completed.

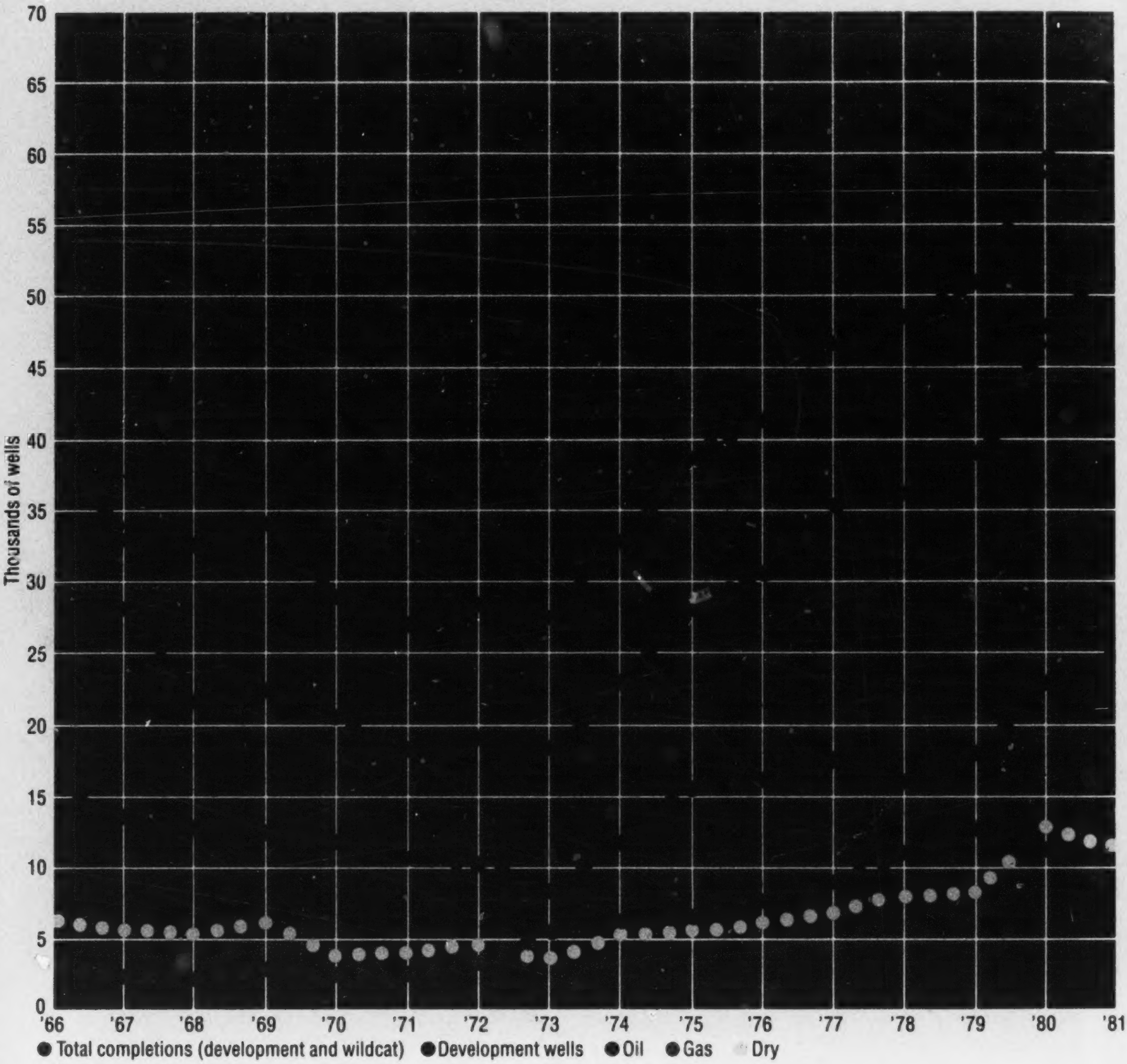
Among the many reasons for the development drilling rage is the drive to get as much oil and gas as possible out of existing reservoirs, plus the continued reluctance on the part of government to open up new and unexplored regions. As long as operators remain limited in their choices of areas in which to explore for oil and gas, they are not likely to narrow the gap between wildcats and development wells.

For the first time in a long time, however, there is hope for a change in federal indifference toward wildcatting. One of the most outspoken advocates of greatly expanded exploratory efforts in prospective basins around the world is Michel T. Halbouty, the Houston, Tex., oilman who also happens to be one of President-elect Ronald Reagan's primary energy advisors.

One of the oilmen closest to President Carter was Robert A. Hefner III of the GHK Companies in Oklahoma City. He is a champion of deep drilling for natural gas in the Anadarko Basin of western Oklahoma and the Texas Panhandle and it is more than just coincidence that one of the Carter administration's most positive energy steps was decontrol of deep natural gas prices.

There is precedent, therefore, for the hope that new areas will eventually be opened up for exploration which, if successful, will lead to still more development drilling.

Meanwhile, the industry will continue to concentrate on the acreage that is available. Sun Co., for example, said recently that it will drill an average of 660 net development wells per year for the next 3



Oil, gas, and dry development well completion trends in the U.S. since 1966.

years. That represents an increase of more than 35% over the company's 1980 program. Sun recently doubled its U.S. acreage by purchasing almost 4 million net acres of unexplored land from Texas Pacific Oil Co. A year earlier, Shell Oil Co. made a similar move by purchasing Belridge Oil Co.

And they are not alone. A number of major oil companies also are looking into purchase of independent producers such as Texas Pacific because, until additional federal lands are opened up for leasing, it is a good way to acquire oil and gas reserves suitable for their expanding development drilling programs. Getty Oil Co., for example, has bought Reserve Oil & Gas Co.; Standard Oil Co. (Ohio) purchased Webb Resources Inc. and Newco Exploration Co.; Gulf Oil Co. bought Amalgamated Bonanza Petroleum Ltd., and Mobil Corp. now owns General Crude Oil Co.

Manpower Limitations

Hughes Tool Co. recently predicted that U.S. drillers would complete 49,875 development wells this year, but that the total will increase to only 49,950 in 1982. This would represent an increase of only 0.1% in development drilling despite a 4% increase in completions. Among the reasons cited by Hughes is availability of qualified manpower—and not just rig personnel. Small companies, it is said, are picking off the majors' geologists, geophysicists, and petroleum engineers at an alarming rate. By purchasing small companies, therefore, larger companies also may be assuring the return of some of their talent.

Qualified drilling personnel are in short supply, as usual, but there also appears to be a serious shortage of people available for training. This is particularly unfortunate right now because the rig building in-

The Quarterly International Active Rig Report as prepared by Hughes Tool Co., Houston, Tex.

Country	Sept. '79	Dec. '79	Mar. '80	June '80	Sept. '80
South America, Central America and Mexico					
Argentina	66	71	73	72	76
Bolivia	6	4	4	4	4
Chile	6	7	6	6	7
Ecuador	4	3	3	3	3
Peru	21	19	19	20	22
Brazil	61	63	64	76	73
Venezuela	44	52	52	54	50
Colombia	17	15	12	14	10
Trinidad	13	13	13	14	12
Mexico	205	213	213	216	216
Central America	–	2	2	3	4
	445	462	461	482	477
Europe					
Austria	11	8	9	8	7
Belgium	–	–	1	1	–
Denmark	–	–	2	3	3
France	13	11	11	11	11
Germany	20	22	21	23	22
Greece	2	2	2	3	3
Holland	17	20	18	20	17
Ireland	4	1	–	–	2
Italy	23	23	19	16	16
Norway	8	8	11	11	11
Spain	6	6	6	12	11
Switzerland	–	–	1	1	1
United Kingdom (North Sea)	33	40	43	50	50
Yugoslavia	22	22	22	22	22
	159	163	166	181	176
Africa					
Algeria	113	113	113	113	111
Angola	5	5	5	5	5
Cameroon	3	7	7	4	4
Congo	–	4	4	4	4
Gabon	6	6	9	9	9
Libya	40	38	45	40	40
Morocco	2	2	2	2	2
Chad	1	1	1	1	1
Nigeria	18	20	20	20	20
Tunisia	8	7	7	7	7
Niger	5	5	5	5	5
Ivory Coast	3	3	3	3	3
South Africa	2	2	2	2	2
Sudan	2	2	2	2	2
Zaire	1	1	1	1	1
	209	216	226	218	216
Middle East					
Abu Dhabi	21	21	21	24	24
Bahrain	1	1	1	1	1
Dubai	1	1	1	3	3
Egypt	20	22	24	27	27
Iran	10	–	–	–	–
Iraq	37	37	37	39	39
Kuwait	2	2	2	3	3
Oman	6	6	7	8	8
Qatar	5	7	7	8	8
Ras Al Khaimah	–	–	–	1	1
Saudi Arabia	24	24	24	25	25
Sharjah	–	–	–	1	1
Syria	16	16	16	15	15
Turkey	7	7	7	7	40
	150	144	147	162	195
Asia					
Bangladesh	2	2	2	2	4
Brunei	8	8	8	8	7
Burma	23	23	23	24	27
India	40	41	43	42	43
Indonesia	66	68	72	77	76
Japan	15	15	15	16	16
North Korea	1	1	1	1	1
Malaysia	13	13	11	11	13
Pakistan	12	13	14	12	14
Philippines	15	16	17	13	9
Thailand	2	3	5	4	5
Taiwan	10	12	12	12	12
Vietnam	2	2	1	1	–
	217	217	224	223	227
Australia	13	12	12	17	19
New Zealand	1	2	2	1	1
Papua New Guinea	–	–	–	1	1
	14	14	14	19	21
Total free world except U.S. and Canada	**1,194**	**1,216**	**1,238**	**1,285**	**1,312**
North America					
Canada	398	330	400	418	387
United States	2,329	2,506	2,659	2,901	3,138
Totals	**3,927**	**4,052**	**4,297**	**4,604**	**4,837**

dustry is turning out more than 40 new rigs each month. Nevertheless, if the people can be found (and it's hard to believe there aren't at least a few good men out there interested in working for a living, even in this day and age), it's entirely possible that development drilling will top 50,000 completions this year and increase by much more than 0.1% over that total in 1982.

It would help, of course, if the Department of Energy would see the light and extend to secondary recovery efforts the same benefits that are allowed for tertiary efforts. Much of the looked-for increase in development drilling then would be infill drilling in established reservoirs where original well spacings would be reduced to greatly increase the amount of recoverable reserves. This idea was given additional merit a few months ago with publication in this magazine of a DeGolyer and MacNaughton article outlining an approach to secondary recovery that DeGolyer and MacNaughton says would result in recovery of 120 billion bbl of the 300 billion bbl of oil previously believed to be unrecoverable in the U.S. (PETROLEUM ENGINEER INTERNATIONAL, November 1980, p. 27).

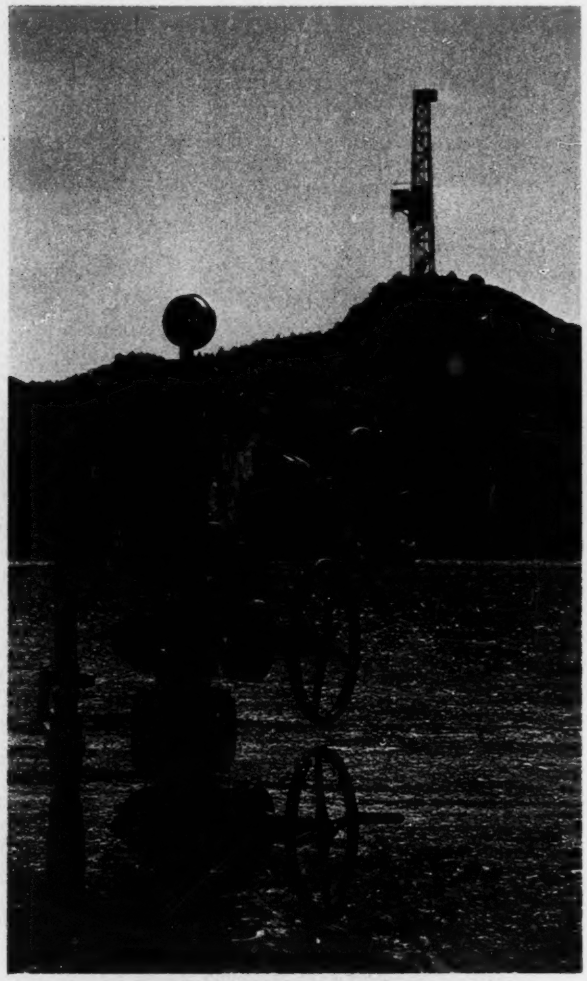
Space limitations preclude a country-by-country rundown of development drilling prospects around the world, but indications are that, with the possible exception of such countries as Iran, Iraq, Afghanistan, and Canada, expeditious development of indigenous oil and gas reserves now is recognized by most governments as their only defense against spiraling prices of imported oil.

Increased Activity

Development drilling should be on the increase in most areas, therefore, although no country has come even close to the rate of increased activity evident in the U.S. As indicated in the accompanying international report from Hughes Tool Co., the Free World's active rig count increased by just over 100 rigs during a 1-year period in which the U.S. added close to 500 new rigs to its inventory. Active rigs, of course, are not the same as rig inventory, but the implications are clear.

Except for Turkey, which changed its rules recently to attract foreign explorationists, all countries covered in the Hughes report have been content with the status quo or with gradual increases in drilling activity. No country, excepting, again, Turkey, registered major increases in activity during the year, but Argentina was up 10, Brazil gained 12, Mexico 11, UK 17, and Indonesia 10.

Turkey's dramatic increase from 7 rigs to 40 during the third quarter of 1980 may be slightly misleading because, prior to the middle of 1979, that country had been running 15 to 20 rigs regularly. So the third quarter 1980 total is essentially a rebound, although admittedly a sensational one. Turkey's best drilling



Development well in the background is being drilled for Apache Corp. in the Blacktail Creek prospect of the Elkhorn Ranch oilfield in Billings County, North Dakota. Apache now has ten producers in the field.

year was 1977, when 105 wells were completed. Of these, 57 were development wells. The annual total fell to 77 wells in 1978, but 42 of them were development wells.

Development drilling should register a healthy increase in India within a few years as a result of that country's $6.25 billion bill for imported oil last year. Approximately 25 onshore and offshore blocks now are available to foreign bidders, with agreements expected to be signed before midyear. Exploration, however, probably will wait until after the monsoon season ends in late summer.

Included in the blocks India is offering are areas along the west coast, south of Ratnagiri in Maharashtra state, and on the east coast, south of Pondicherry. The government, however, is not expected to permit foreign firms to explore in areas where its Oil and Natural Gas Commission already has discovered hydrocarbons. ONGC currently is actively exploring the offshore Godavari Basin in the Bay of Bengal and the Andaman Island shelf, where one well already has yielded gas. In addition, ONGC plans to drill four more wells in the Cauvery Basin, on the east coast, where one of the five wells already drilled turned up weak gas deposits. A deep well, to 15,000 ft, is planned for the Gulf of Kutch on the west coast, and a rank wildcat is scheduled to be drilled offshore in the Lakshadweep chain of coral islands off the southwest coast.

Oil India Ltd. is busy developing a 4,500-sq-mile area in the Mahanadi Basin off the east coast, next to where it has just been granted an additional 10,500-sq-mile concession.

Foreign Participation

All this activity, along with good prospects for increased foreign participation, makes India a potential market for at least $1 billion worth of exploration and production equipment during the 1980s.

Pakistan also is anxious to attract foreign participation in its oil and gas search, and has talked most recently with British Petroleum Co. about exploring for oil in Baluchistan province.

India and Pakistan are typical of those parts of the world where exploration for oil and gas had been half-hearted, at best, until events of recent years—most graphically in nearby Iran and Iraq—created a strong sense of urgency. Pakistan imports more than 29 million bbl of crude oil a year, while producing only 3.7 million bbl. India imports more than 100 million bbl/year, but its import bill for 1980 approached $6.25 billion, compared with a bill for $4.75 billion in 1979 for the same level of imports.

In Jakarta, Indonesia, meanwhile, the Association of Southeast Asian Nations (ASEAN) signed a cooperation agreement with a United Nations committee for coordinating joint prospecting for offshore mineral resources. The agreement covers stratigraphic correlation studies, establishment of an oil data bank, study of geothermometry and heat flow, and analysis of the marine environment.

The exploration pace in these areas, therefore, should pick up markedly within the next few years, and that could be good news for development drillers during the remainder of the 1980s.

China also is in the market for Western equipment and technology because output from its existing onshore fields is expected to begin declining by 1982. China has already contracted with Japanese, U.S., and British firms for offshore exploratory drilling and is considering bids from Western firms for development of offshore oil and gas reserves.

Agreements have been signed by China with Japanese and French firms to develop reserves in the Bohai and Beibu Gulfs, under joint-investment and risk-sharing arrangements. American oil firms are expected to assume a major role in developing the oil potential of South China Sea fields.

Onshore, China is hoping to stir up foreign interest in potential oil deposits in the far western province of Xinjiang. A number of U.S. oil companies reportedly have expressed interest, but problems of producing the oil and getting it to the rest of the country are

Alaskan in scale. Most of Xinjiang is desert and mountains, scorching hot in summer and frozen in winter. It is also 2,000 miles from China's industrial centers along the east coast.

China is anxious to develop its onshore oil, in any event, because most of its offshore reserves already are earmarked for export markets. The only major oilfield currently in production in Xinjiang is at Karamai, in the northwest. Output is 80,000 b/d, and the oil is transported by truck to Urumqi, 230 miles to the southeast, and then moved in railroad tank cars to a refinery in Lanzhou, another 1,000 miles to the east.

Russian Pipeline Proposal

Although it probably won't have an effect on foreign petroleum and drilling companies, Russia could be the scene of much development drilling if its 2,500-mile pipeline proposal gains approval. The $14 billion project would connect customers in Western Europe with gas supplies in western Siberia. The Russians will undoubtedly do their own development drilling to increase gas production from the Yamal field for the project, but there could be a big market for development drilling equipment and supplies if Afghanistan-inspired sanctions can be overcome. If all goes as planned, Siberian gas could be flowing into Western Europe as early as 1984.

Another potential development drilling area could turn up offshore Ireland within the next year or so. Exploration in the Porcupine Basin, west of Galway and the Aran Islands, could find as much as 300 million bbl of recoverable oil, or half the country's imports. Development drilling in the area would be quite a project, however. Waters are 1,200 ft deep, and they're much more hostile than waters in the Gulf of Mexico, home of the current water depth production record of 1,000 ft.

In the North Sea, expectations are that development drilling will not show much of an increase for another 3 years because all available rigs are spoken for. Exploratory drilling, which is expected to increase by 40% by 1983 over a relatively low point in 1979, will absorb most of the new rigs expected to join the North Sea fleet for the next few years.

Heavy Oil Development

Across the Atlantic Ocean, Venezuela could become a major development drilling province if its $8 billion plan for development of the Orinoco heavy oil belt gains approval. The main catch is that the plan involves participation of foreign oil companies, which have not been welcome in that country since the government nationalized its oil industry in 1976.

Development of the 17,000-sq-mile reserve could result in production of 300,000 b/d of upgraded crude by the year 2000. Initial production in 1988 would be about 125,000 b/d. The project includes approximately $20 billion in production and refining installations and $10 billion in infrastructure development. More than 1,000 development wells are called for, in addition to 185 miles of oil pipeline and 42 miles of water pipeline.

Elsewhere in Latin America, Brazil's national oil company, Petrobras, is embarking on an ambitious 5-year plan to reach an output of 500,000 b/d of oil by the end of 1985. Production from existing fields, either producing or being developed, is projected to reach 370,000 b/d by 1985, which means that additional reserves on the order of 1.9 billion bbl will have to be discovered within 3 or 4 years to permit added production of 130,000 b/d.

The 5-year plan calls for the drilling of 1,750 wildcats and shooting of approximately 200,000 miles of seismic lines.

Aid from Mexico

Mexico, which is feeling good about its petroleum prowess these days, already is exploring for oil and gas in Costa Rica and Nicaragua and is offering to lend a hand to such additional countries as Panama, Cuba, and China. At a meeting in Mexico City recently, Jorge Diaz Serrano, head of Pemex, the country's national oil monopoly, said that Mexico led the world in discovery of new petroleum deposits during the 1970s. In 1976, he said, Mexico's proven reserves were about 6.3 billion bbl. He added that the current proven reserves figure for Mexico is 60.126 billion bbl.

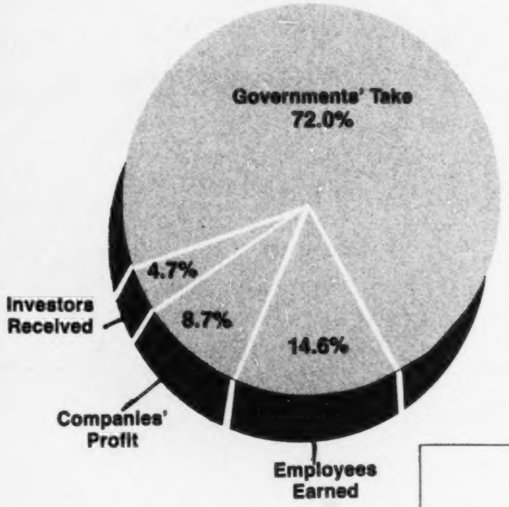
Mexico's 10-year energy plan calls for production of 3.5 million b/d of oil by 1985—an increase of nearly 50% over previous estimates. Current Mexican production stands at 2.3 million bbl. Indications are, therefore, that plenty of development drilling is in store. Development of Mexico's offshore reserves will be expedited by the one-a-month delivery of 18 offshore drilling platforms during the next year or so from a new construction facility near Tampico on the Panuco River.

Mexico is able to offer exploratory services to other, less fortunate, countries because it is particularly interested right now in defining the limits of the fields it has already found within its own borders, particularly offshore. Development wells in the Bay of Campeche produce more than 30,000 b/d apiece. Onshore, in the Chiapas-Tabasco area, average production per well is 7,000 b/d.

In Canada, meanwhile, what had appeared to be a long-term boom area for development drilling only a few months ago seems to be turning into a bust. Prime Minister Pierre Elliott Trudeau's proposals for increasing Canadian ownership of oil-company assets have been met with dismay by both the industry and by oil-producing provinces in western Canada. The Canadian Association of Oilwell Drilling Contractors is of the opinion that the situation could result in the drilling of about 5,500 wells in Canada this year, compared with nearly 9,000 in 1980.

And the trouble is not confined to the active drilling areas of western Canada. A row shaping up between Ottawa and Newfoundland over the question of provincial vs federal rights to offshore oil seems certain to delay additional exploratory and development drilling at potentially prolific finds in the Hibernia and Sable Island areas of the North Atlantic Ocean. ■

Beneficiaries of Integrated Oil Companies' Operations			
Employees' pay and benefits after taxes	$ 17.233 billion	EMPLOYEES EARNED	14.6%
Earnings of 44 companies after dividends	$ 10.359 billion	COMPANIES' PROFIT	8.7%
Dividends after taxes paid by stockholders	$ 5.593 billion	INVESTORS RECEIVED	4.7%
Taxes paid by companies/investors/employees and collected from consumers	$ 85.367 billion	GOVERNMENTS' TAKE	72.0%
BOTTOM LINE	$118.552 billion		100.0%



Governments Take 72%

by Ernestine Adams, *Editor, Energy Management Report* and Julie Fonner, *Assistant Editor*

Governments are the winners, hands down, in oil company operations. In 1979, the 44 companies we surveyed for the fifth year, provided governments (local and national, U.S. and foreign) with a minimum 72% of their take from consumers.

This does not include government revenues from companies handling equipment, services and supplies and their stockholders and employees. They pay as much or more into government coffers as oil companies do.

Purchases of capital goods like refinery units and tanks, services like drilling and pipeline laying, supplies such as chemicals and pencils, make up a major part of an oil company's expense column.

The companies that provide those items are swamped by taxes which their customers have to cover.

"Windfall Profits" tax in the U.S. was not broken out because it did not operate for the full year. It is included in "Other Taxes." The sum of that column rose from $38.6 billion in 1978 to $55.7 billion in 1979.

Governments' take rose a couple of points. It was 70.2% in 1978. Other groups were down slightly percentage-wise, although actual figures were up over 1978.

WHO GOT WHAT FROM 44 OIL COMPANIES' OPERATIONS IN 1979

	COMPANY'S PROFIT	INVESTORS RECEIVED	EMPLOYEES EARNED	GOVERNMENTS' TAKE				
Company	Net income* after dividends ($000)	Dividends (common & preferred) ($000)	Payrolls & Benefits ($000)	Taxes on Dividends[1] ($000)	Taxes on employees' share[2] ($000)	Excise taxes on products[3] ($000)	Other taxes[4] ($000)	Total taxes ($000)
Amerada Hess	365,920	84,205	186,000[e]	16,841	62,000	98,000[e]	891,920	1,068,761
American Petrofina	32,759	25,214	81,525	5,043	27,175	46,741	74,277	153,236
Ashland Oil	387,315	69,469	524,862	13,894	174,954	266,496	333,227	788,571
Atlantic Richfield	508,761	337,492	1,122,400	67,498	374,133	442,718	1,429,506	2,313,855
Cities Service	159,100	94,200	481,000	18,840	160,333	144,800	382,900	706,873
Clark Oil & Refining	28,412	6,623	90,900	1,325	30,300	134,345	56,488	222,458
Coastal Corp.	77,983	11,249	163,000	2,250	54,333	48,200	82,600	187,383
Conoco Inc.	449,295	183,195	1,059,600	36,639	353,200	203,400	2,749,500	3,342,739
Crown Central Petr.	58,384	6,647	43,591	1,329	14,530	82,204	58,780	156,843
Crystal Oil	6,421	1,906	8,857	381	2,952	0	11,025	14,358
Diamond Shamrock	24,409	76,857	341,000	15,371	113,667	18,348	108,058	255,444
Dorchester Gas	25,105	47	10,946	10	3,649	646	32,747	37,052
Earth Resources	5,963	5,262	21,080	1,052	7,027	9,600	20,640	38,319
Exxon	857,063	1,719,090	4,182,000	343,818	1,394,000	4,448,582	16,906,707	23,093,107
Getty	373,331	116,087	353,765	23,217	117,922	154,787	1,109,787	1,405,713
Gulf Oil	518,000	402,000	1,481,000	80,400	493,667	1,983,000	2,404,000	4,961,067
Holly Corp.	7,023	0	9,402	0	3,134	6,000	5,125	14,259
Husky Oil Ltd.	70,104	11,498	95,400	2,300	31,800	68,600	65,126	167,826
Kerr-McGee Corp.	79,819	40,099	252,000	8,020	84,000	81,000	174,473	347,493
Louisiana Land & Expl.	64,210	52,417	62,819	10,483	20,940	0	164,853	196,276
Mapco Inc.	19,365	26,374	106,000	5,275	35,333	3,915	68,163	112,686
Marathon Oil	125,716	84,773	335,070	16,955	111,690	455,461	983,665	1,567,771
Marion Corp.	17,075	1,086	9,396	217	3,132	0	16,358	19,707
Mobil Corp.	925,556	540,801	3,603,000[e]	108,160	1,201,000	2,764,411	11,932,591	16,006,162
Murphy Oil	78,733	12,424	94,859	2,485	31,620	183,155	235,710	452,970
Occidental Petroleum	303,086	126,780	799,523	25,356	266,508	714	1,514,471	1,807,049
Pacific Resources	9,352	18,227	16,128	3,645	5,376	0	14,636	23,657
Pennzoil Co.	79,682	79,418	219,400	15,884	73,133	28,008	186,342	303,367
Phillips Petroleum	474,167	208,477	863,000	41,695	287,667	156,000	1,394,944	1,880,306
Quaker State	1,419	16,351	94,370	3,270	31,457	18,495	34,170	87,392
Shell Oil	481,159	322,201	1,173,000	64,440	391,000	790,822	1,090,056	2,336,318
Southern Union Co.	6,242	13,912	47,000	2,782	15,667	429	38,190	57,068
Standard California	794,770	494,962	1,120,000	98,992	373,333	990,863	2,347,023	3,810,211
Standard Indiana	621,358	442,630	1,287,854	88,526	429,285	1,267,400	2,016,970	3,802,181
Standard Ohio	892,180	146,968	541,071	29,394	180,357	305,726	1,009,729	1,525,206
Sun Co.	354,700	172,600	979,300	34,520	326,433	459,400	716,200	1,536,553
Tenneco	21,000	259,000	1,500,000[e]	51,800	500,000	260,000	325,000	1,136,800
Tesoro Petroleum	40,189	9,565	61,522	1,913	20,507	20,000	44,988	87,408
Texaco Inc.	608,153	575,458	1,701,800	115,092	567,267	3,116,214	3,770,800	7,569,373
Tipperary Corp.	2,321	0	3,934	0	1,311	0	1,573	2,884
Texas Eastern Corp.	37,336	80,362	120,015	16,072	40,005	0	270,156	326,233
Tosco Corp.	78,028	1,108	92,230	222	30,743	102,428	86,322	219,715
Union California	275,404	112,600	486,300	22,520	162,100	400,852	545,000	1,130,472
United Refining	12,953	2,111	22,906	422	7,635	67,953	17,731	93,741
TOTAL	10,359,321	6,991,745	15,848,825	1,398,348	8,616,275	19,629,713	55,722,527	85,366,863

[1] Taxes on dividends are 1/5; inflation increases tax without a rate increase. [2] Employees' taxes are estimated at 1/3, calculated by Taxpayers' Foundation as the average rate for employed persons. [3] U.S. federal excise tax is 4¢/gallon on gasoline in 1979; state taxes averaged about 8¢/gallon. Other products have lower excise tax. [4] Taxes levied directly on companies: Income taxes (before dividends), property taxes, severance taxes on oil/gas production, sales taxes on goods purchased, tariffs, and "Windfall Profits Taxes." *Excluding non-recurring items. [e] Estimate.

PROFESSIONAL OPPORTUNITIES

"If output is to grow, one of productivity's vital ingredients, the input, of energy, must be available and usable," President John F. Bookout of Shell Oil told a faculty group last spring.

There is no statistical link between energy and productivity but you can see a logical tie. With no energy to run an economy, you have no modern economy.

It is obvious also that productivity of the American worker, and those of other nations, has declined since energy was controlled. In the 1947-1967 period an annual gain of 3.7% was recorded in the U.S. From 1967-1977 average increase came down to 1.8%.

Last year and most of this year the figures see-sawed downward, putting the U.S. in the minus column. Productivity dropped in second quarter of 1980 by an annual rate of 1.9% after a decline of 0.6% in first quarter. That was the sixth decrease in succession. Labor Dept. said U.S. business had a 2.6% rise in productivity for the third quarter.

Company	Professional* Employees 1979	1978	1977
Adams Res. & Energy	150	100	
Altex Oil	3	4	
Amarex Inc.	26	31	34
Amcole Energy	6	12	
Argonaut Energy	13	12	9
Argo Petroleum	22	25	25
Ashland Oil	6,535	7,107	7,296
Brock Exploration	20	20	12
C&K Petroleum	46	40	
Centura Energy	23	23	
Columbia Gas	1,022	1,022	1,022
Commonwealth N.R.	52	52	52
Commonwealth OR	459	416	438
Consolidated N.G.	1,675		
Consolidated O&G	16	9	7
Crystal Oil	229	198	142
Energy Reserves Gp.	220	200	170
Enserch Corp.	7,095	6,263	5,419
Felmont	35	39	37
Forest	250	250	
Galaxy Oil	13	10	12
Hadson Petroleum	24	19	
Helmerich & Payne	194	169	154
Howell Corp.	60	150	140
Inexco Oil	70	60	50
Juniper Petroleum	24	24	21
Louisiana L&E	301		
MGF Oil	80	60	
Mapco Inc.	500	390	350
Marion Corp.	42	36	34
May Petroleum	24	21	8
McMoRan Oil & Gas	105	63	38[e]
Mesa Petroleum	84	75	56
Mitchell Energy	633	575	525
Noble Affiliates	165	150	
Peninsula Resources	12	10	
Petro-Lewis	417	326	246
Phillips Petroleum	7,820	7,150	6,670
Pioneer Corp.	546	530	519
Quaker State	500	515	485
Sabine Corp.	70	60	40
Southland Royalty	199	258	224
Sundance Oil	16		
Supron Energy	56	51	45
Tesoro Petroleum	660	683	717
Texas American	21	18	16
Texas Eastern	650	634	568
Transco Companies	825	745	653
Tribune Oil	3	3	3
United Energy Res.	1,063	923	806
Universal Resources	45	44	35
Vanderbilt Energy	12	10	7
Woods Petroleum	62	67	57
Worldwide Energy	20	20	20
TOTAL	30,426	28,993	27,154

[e] Estimate. *Managers, lawyers, engineers, geologists, accountants, scientists, etc.

An associate director of Commerce Dept.'s Bureau of Economic Analysis puts it succinctly: "Productivity has gone to pot since 1973."

The energy industry needs an influx of professionals--managers, geologists, engineers (all kinds)--and without them we can't get the economy off the ground. Energy operations always need special technology and today it needs it more than ever.

Consulting services here and in other industrialized nations are esstenial to devise plans for oil and gas operations in states where politicians run the energy business.

In earlier days coal ran the economy of industrial states. Now coal industry is limited by deterioration of infrastructure and environmental laws. Getting coal out of the ground and to market is work too hard for current laborers.

Coal is found in every continent, but the U.S. is estimated to have the largest reserves. It is being exported from U.S., however, because regulations have discouraged use. Transportation problems and lack of ports hold down production.

When chief executives of national oil firms from Organization of Petroleum Exporting Countries members met in Vienna, main topics included manpower evaluation and on-the-job training. U.S. problems are multiplied in other countries.

And the U.S. does have shortage problems of professionally trained and experienced people. Some executives wonder if the synfuels program, which will require squadrons of engineers and scientists, can operate with the present supply.

Says one man who should know, "The work load for engineers is going to double."

What this section will strive for is to help fill jobs that increase energy, which will, in turn, increase the hum of the economy.

FEB.

1981

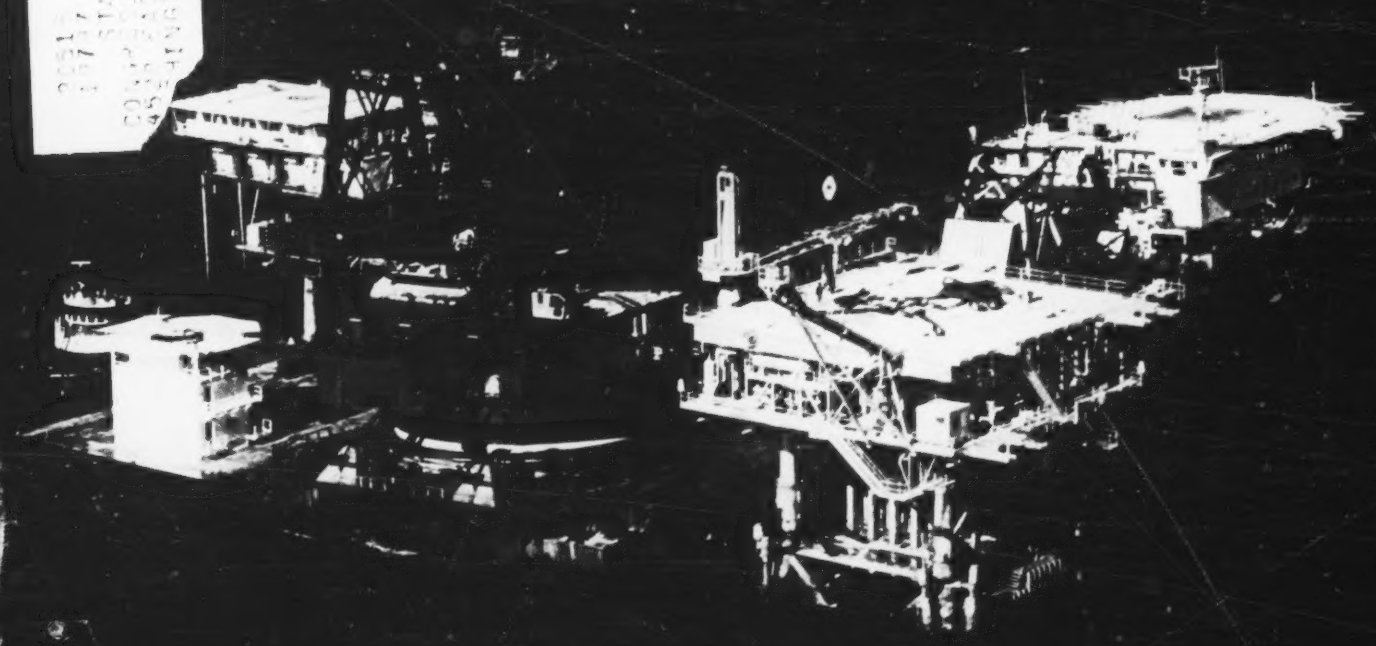
THE INTERNATIONAL MAGAZINE OF METHODS FOR ENGINEERING/OPERATING PEOPLE

Petroleum Engineer® INTERNATIONAL

FEBRUARY 1981 • $3.00 PER COPY

20518 15193 PEI
157 REFERENCE INDEX
[illegible] INFORMATION SVC
4520 EAST-WEST HIGHWAY ST 900
WASHINGTON DC 20014

2/11/81 C [illegible]



WORLD OFFSHORE FORECAST

- Rolling Flow Lines Into Position, p. 26
- Production Risers—Part 5, p. 36
- Innovative Deck Switch, p. 51
- Resurgence At Huntington Beach, p. 82
- International Offshore Rig Locator

Active Rigs, Completions Set Records In 1980

Boys, 1980 was some year. Drilling in the U.S. set records for both the number of rigs active and for the number of wells completed. And early returns from 1981 activity are so encouraging that some prognosticators already are revising upward earlier predictions that U.S. drillers will set still more records this year.

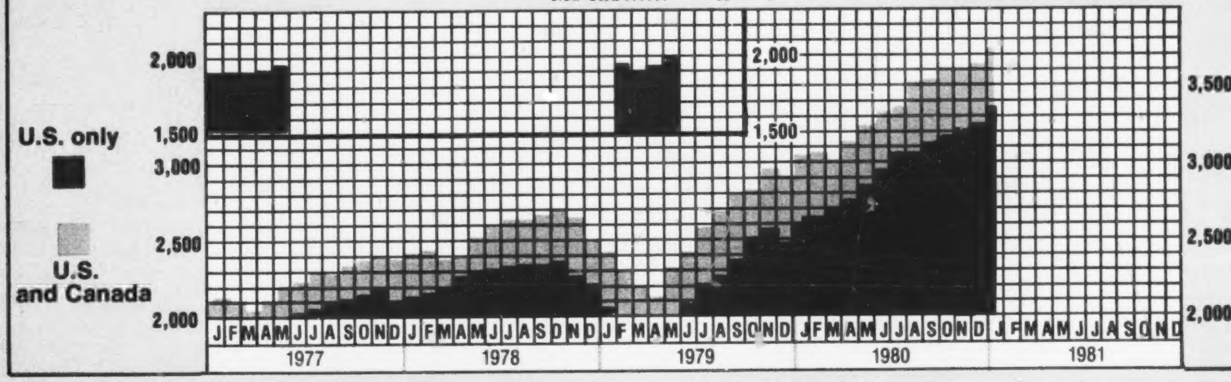
The average rig count last year was 2,916, which was 731 rigs higher than the average for 1979. Preliminary reports put 1980 completions at more than 62,000, much higher than the previous record of 57,111 wells set in 1956.

For Canadian drillers, 1980 will be a year to remember. They averaged a record 403 active rotaries during 1980, but at year-end were dismantling much of what still is the Free World's second largest rig fleet.

Rotary Rigs Actually Making Hole In United States & Canada

As Reported to International Association of Drilling Contractors by Hughes Tool Company

	Dec. 22, 1980	Dec. 30, 1980	Jan. 5, 1981	Jan. 12, 1981
Alabama	9	9	10	14
Alaska				
Land	22	22	22	24
Offshore	1	1	1	2
Arkansas	32	31	33	33
Arizona	1	1	1	1
California				
Land	115	117	122	115
Offshore	21	21	21	21
Total	136	138	143	136
Colorado	67	65	63	64
Florida	3	3	4	5
Georgia				
Land	1	1	1	1
Idaho	2	1	2	1
Illinois	30	30	30	30
Iowa	0	1	0	0
Kansas	158	159	162	161
Kentucky	4	4	3	3
North Louisiana	51	49	51	49
South Louisiana				
Inland Waters	83	82	81	77
Land	160	162	149	166
Offshore	148	146	141	138
Total	442	439	422	430
Maryland	1	1	1	0
Michigan	32	32	32	35
Mississippi	63	66	55	67
Montana	66	63	66	67
Nebraska	14	18	18	15
Nevada	7	7	7	6
New Mexico	128	124	129	128
New York	11	9	9	10
North Dakota	95	96	96	96
Ohio	92	92	92	93
Oklahoma	495	501	510	523
Oregon	1	1	1	1
Pennsylvania	29	31	31	29
Rhode Island				
Land	1	1	1	1
Offshore	2	2	2	2
South Dakota	3	3	3	2
Tennessee	1	0	0	0
Texas				
Offshore	82	82	83	82
Dist. 1	51	51	55	53
Dist. 2	57	52	50	57
Dist. 3	189	191	198	197
Dist. 4	112	113	117	114
Dist. 5 & 6	127	132	128	128
Dist. 7B	87	85	82	80
Dist. 7C	73	69	73	88
Dist. 8	127	119	122	124
Dist. 8A	82	82	73	74
Dist. 9	69	68	73	76
Dist. 10	51	52	47	47
Total	1107	1096	1101	1115
Utah	62	59	61	69
Virginia	1	1	1	1
Washington (State)	1	1	1	1
West Virginia	44	44	44	40
Wyoming	164	173	170	177
Total U.S.	3328	3326	3337	3383
Western Canada	430	339	272	399
Eastern Canada	4	4	4	4
U.S. and Canada	3762	3669	3613	3786



PETROLEUM ENGINEER INTERNATIONAL • 800 Davis Building • Dallas, Texas 75202 • TWX 910-861-9306

Abbott Sparks	President
John G. Grant	Publisher and Vice President
W. B. Bleakley	Editor
Richard D. McNally	Associate Editor
Steven D. Moore	Technical Editor
Mary Jane Ellis	Assistant Editor
Laura Jacobus	Assistant Editor
Edna Taylor	Editorial Assistant
J. E. (Hank) Kastrop	Consulting Editor
Renn Rothrock, Jr.	Consulting Editor
Ernestine Adams	Editor, Energy Management Rpt.
Julie Fonner	EMR Assistant Editor
Gregory Martin	Editor, Energy News/Energy Week
Sharon Hutcheson	Editorial Assistant

•

Alan Hilton	Service R&D Manager
Denise Tevis	Service R&D Department
Olga Dunn	Reader Service

•

ADVERTISING SALES OFFICES

EASTERN: Richard Martin, P.O. Box 89, Tennent, New Jersey 07763, (201) 446-3230

CHICAGO 60646: Bill Facinelli, Dwain Helmgren 4761 West Touhy Ave., Lincolnwood, Illinois, (312) 679-1100

OHIO, WESTERN PA.: Dwain Helmgren, 4761 West Touhy Avenue, Lincolnwood, Illinois (312) 679-1100

LOS ANGELES 91106: Bruce Berkey, 61 S. Lake Ave., Box 4566, Pasadena, Calif., (213) 681-0685.

HOUSTON 77027: Jess Adkins, Vice Pres., Gulf Coast Regional Manager, **Barry Bilkiss, Hal Odum,** 4151 Southwest Freeway, Suite 115, (713) 626-7850

DALLAS 75202: Ed Sealey, 800 Davis Bldg., (214) 748-4403, TWX 910-861-9306

WEST TEXAS: Rusty Meador, P.O. Box 611, Eldorado, Texas 76936 (915) 853-2689

UNITED KINGDOM, NETHERLANDS, SCANDINAVIA: Bryan Clark, Energy Publications, Div. HBJ, 24/28 Oval Road, London NW1 7DX, England, (01) 485-7074 (or 7075). Cable: HARBREX London NW1; Telex: 25775

FRANCE, ITALY, BELGIUM, SWITZERLAND: Gerard Lasfargues, 32, rue Desbordes Valmore, 75016-Paris, France, Telephone: 504 97 94

JAPAN: Mashy Yoshikawa, Orient Echo, Inc., 11th Floor Sankyo Bldg., 7-12 Tsukiji 2-chome, Chuo-ku, Tokyo, Telephone: 541-4923, Cable: MYORIENTECHO

GERMANY, AUSTRIA: S.I.P.A.S., Wim. J. M. Sanders, Paul J. Verbeek, Raadhuisstraat 24, P.O. Box 25, 1484 EN Graft-de Ryp, Holland, Telephone 02997-1303 and 3660. Telex: 13039 sipas nl, Telegrams: SIPAS-Amsterdam

Jane Dietz	Production Department Manager
Don Fickert	Graphics Director
Janell Fowler	Production Manager
Debbie Cooper	Production Coordinator
Dennis Howard	Presentation
Laura Page	Presentation
James Duke	Presentation
Victoria Valentin	Presentation

•

Gary Hogan	Business Manager
Jack Schabel	Circulation Director
Royal Courtney	Circulation Fulfillment Manager

ENERGY PUBLICATIONS
• a Division of Harcourt Brace Jovanovich •
P.O. BOX 1589 • 800 DAVIS BUILDING
DALLAS, TEXAS 75221 • (214) 748-4403

PETROLEUM ENGINEER INTERNATIONAL
Pipeline & Gas Journal
Energy Management Report
Energy News • Energy Week

HBJ A HARCOURT BRACE JOVANOVICH PUBLICATION
ABP
ABC

EDITORIAL ADVISORY COMMITTEE
Lloyd E. Elkins, Petroleum Consultant
Bennie L. Franks, President, Sun Texas Co.
Dennis E. O'Brien, Technology Section Head, Exxon Chemical Company
B. R. Jones, President, Eagle Production and Drilling Co.
Frank Schuh, Director of Engineering Development, ARCO Oil and Gas Co., a Division of Atlantic Richfield Co.
Marius J. Mes, Senior Research Scientist, Production Research Department, Conoco Inc.

PETROLEUM ENGINEER INTERNATIONAL (USPS 429-380) published 15 times each year, monthly plus March 15, July 15 and November 15, by Energy Publications Division, Harcourt Brace Jovanovich, P.O. Box 1589, Dallas, Texas 75221.

January, 1981, Volume 53, No. 2.

Copyright© 1981 by Harcourt Brace Jovanovich, Inc. All rights reserved. No part of this publication may be transmitted or reproduced in any form or by any means, electronic or mechanical, including photocopy, recording, or any information storage and retrieval system, without permission in writing from the publisher.

Subscription rate to personnel employed by companies involved with exploration, drilling, production, or field processing of oil or gas: one year $12.00, two years $18.00, three years $24.00 for North, Central, and South America. Outside North, Central, and South America: one year $25.00, two years $35.00, three years $45.00. Subscription rate for all others: $25.00 for one year. Single copy price $3.00. Entered as second class mail matter January 15, 1949, at the post office in Dallas, Texas, under the act of March 3, 1879. Microfilm copies are available through University Microfilms, Inc., 313 North First Street, Ann Arbor, Michigan. Indexed by Applied Science, Technology Index and the Engineering Index, Inc.

Postmaster: Send address changes to PETROLEUM ENGINEER INTERNATIONAL, P.O. Box 1589, Dallas, Texas 75221, USA.

HARCOURT BRACE JOVANOVICH PUBLICATIONS

ROBERT L. EDGELL, Chairman; RICHARD MOELLER, President; LARS FLADMARK, Executive Vice President; ARLAND HIRMAN, Treasurer; JOE BILDERBACH, Vice President; JAMES GHERNA, Vice President; GEORGE GLENN, Vice President; THOMAS GRENEY, Vice President; EZRA PINCUS, Vice President; HARRY RAMALEY, Vice President; ABBOTT SPARKS, Vice President. OFFICES: 757 Third Avenue, New York, N.Y. 10017. Phone (212) 888-4444; 1 East First Street, Duluth, Minnesota 55802. Phone (218) 727-8511. 111 East Wacker Drive, Suite 1730, Chicago, Ill. 60601. Phone (312) 938-2300.

ABOUT THE COVER: A number of offshore "firsts" were scored by Sun Gas Co. when decks were installed recently on two new platforms in the Gulf of Mexico. For the full story, see p. 51.

NEXT MONTH: The annual Deep Well Report this year is expected to show a substantial gain in number of wells drilled deeper than 15,000 ft in the U.S.

Petroleum Engineer® INTERNATIONAL

The international magazine of methods for engineering/operating people

FEBRUARY 1981 NUMBER 2 VOLUME 53

OFFSHORE TECHNOLOGY

Political Disputes Spawn Offshore Questions 21

by Rich McNally, Associate Editor

International argumentativeness is crimping what should be an all-out search for oil and gas.

Flow Line Gets Wheels For Ocean-Floor Tow 26

by W.B. Bleakley, Editor

War-surplus mine-net buoys are part of a unique solution to flow-line application offshore California.

Modern Production Risers — Part 5 36

by George W. Morgan, Engineering Consultant

Riser bases must conform to hydraulic, mechanical, structural, and geotechnical parameters.

Sun Gas Saves $1 Million On Platform Deck Switch ... 51

by W.B. Bleakley, Editor

More than 80 crane lifts were eliminated by the decision to move the entire deck.

Drillstem Tests Aid Tubing And Gas Lift Designs 58

by Eni P. Kanu and Eduardo Proano, Johnston-Macco Schlumberger

It is important to investigate system capabilities before installing tubing and flow lines.

Petroleum Engineering Quiz 78

Guest professor is George V. Chillingar, University of Southern California.

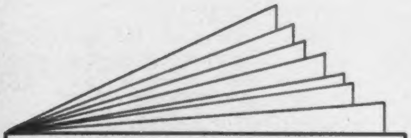
Huntington Beach Activity Surges Ahead 82

by Steven D. Moore, Technical Editor

The results of increased EOR incentives and better prices are showing up at the 50-year-old field.

International Offshore Rig Locator R-1

Locations, specifications, ratings, and status of almost 800 offshore drilling rigs.



ENERGY management report™

by Ernestine Adams

Comment EM 1

Energy World Report EM 2

International Design/Engineering EM 4

Financial Notebook EM 5

Oil/Gas Professional Opportunites EM 8

New Products EM 14

EDITORIAL DEPARTMENTS

News Hi-lites 1

Significant Happenings in Petroleum

Course of Oil 6

Reagan's Rocky Road

Technology Trends 8

Forecasts from Current Events

Offshore Technology 11

Seafloor Earthquake Measurement

Continuous Tables 75

Company News 94

Drilling/Exploration 98

$38 Billion for Enhanced Recovery

Industry Meeting Calendar 102

Petroleum Profiles 106

Five Minutes with Jacques Delacour

Professional Directory 114

Oil & Gas Professional Opportunities EM 6

Index to Advertisers EM 18

$38 Billion Projected For Enhanced Recovery In '80s

Conditions are favorable for normal market forces to encourage continuing expansion in enhanced oil recovery efforts, according to a recent study by Frost & Sullivan Inc. of New York.

Total U.S. expenditures of $38 billion are projected by F&S for enhanced recovery during the 10-year period 1979-88. With EOR technologies accounting for 60 to 70% of the total, F&S breaks down the expenditures as follows:

- Oilfield services, $12.5 billion.
- Oilfield equipment, $11.5 billion.
- Injection fluids, $14 billion.

The domestic U.S. EOR market is projected to expand from $1.65 billion in 1978 to $6.5 billion in 1988, according to Frost & Sullivan, who expect hydraulic displacement methods to decline from a 65% share in 1978 to a 27% share in 1988.

Thermohydraulic methods should reach a 13% share of EOR expenditures in 1988, up from 9% in 1978, and miscible-hydraulic methods should reach a 60% share in 1988, up from 26%. The cost of fuel is not included in F&S's projections, which sharply depresses the thermohydraulic total.

F&S predicts cumulative expenditures and average (compound) growth rates of EOR technologies during the 1979-88 period will be:

- Hydraulic displacement: cumulative expenditures, $13.9 billion; growth rate, 5½%/year.
- Thermohydraulic displacement: expenditures, $4.7 billion; growth, 18½%/year.
- Miscible hydraulic displacement: expenditures, $19.4 billion; growth, 25%/year.

The most important specific EOR technologies in terms of their expenditure-growth are expected by Frost & Sullivan to be nitrogen repressurization, steam drive, CO_2 miscible flooding, and microemulsion flooding. Polymer flooding also is projected to record substantial growth, while insitu combustion methods are not expected to contribute materially to the total EOR expenditures during this decade.

As indicated in Table 3, F&S looks for oilfield services in support of EOR operations to decline from 48% of total expenditures in 1978 to 29% in 1988. Oilfield equipment is projected to maintain a constant 30% share, while injection fluid expenditures should increase from 22% of the total in 1978 to

TABLE 1. U.S. enhanced recovery production (1978)

EOR method	Production, MM b/d	% Total
Water and gas injection[1]	4.20	90%
Steam injection	0.25	6%
Miscible gas injection[3]	0.11	3%
Other methods[2]	0.04	1%
Total	4.60	55% of total domestic production

1 Includes nonmiscible gas injection (natural gas, inert gas)
2 Includes microemulsion, polymer and caustic flooding, in-situ combustion, other methods
3 Includes CO_2 and hydrocarbon miscible methods

TABLE 2. U.S. EOR market (1978-88) in millions (constant 1978-$)

Market classification	1978	1980	1982	1984	1988
Hydraulic displacement	$1,075	$1,150	$1,225	$1,400	$1,800
Waterflooding	975	1,040	1,100	1,200	1,400
N-G injection	50	30	-	-	-
Inert-gas injection	50	80	125	200	400
Thermohydraulic displacement	$ 150	$ 225	$ 350	$ 500	$ 800
Steam flooding (cyclic and drive)	140	210	325	435	675
In-situ combustion	10	15	25	40	75
Other thermal methods	-	-	-	25	50
Miscible-hydraulic displacement	$ 425	$ 800	$1,225	$1,900	$3,900
CO_2 flooding and H-C miscible	360	675	975	1,350	2,300
Microemulsion flooding	40	75	150	300	1,000
Polymer and caustic flooding	25	50	100	200	425
Other miscible methods	-	-	-	50	175
Total	$1,650	$2,175	$2,800	$3,800	$6,500

TABLE 3. U.S. EOR expenditures (1978-88) in millions (constant 1978-$)

Product category	1978	1980	1982	1984	1988
Oilfield services	$ 800	$ 925	$1,050	$1,225	$1,875
Drilling	325	375	425	500	800
Well maintenance	300	325	350	375	575
Other services	175	225	275	350	500
Oilfield equipment	$ 490	$ 650	$ 850	$1,125	$1,975
Tangible well equipment	250	300	375	450	700
Artificial lift equipment	90	125	175	225	400
Injection equipment	50	75	100	125	225
Other equipment	100	150	200	325	650
Injection fluids	$ 360	$ 600	$ 900	$1,450	$2,650
Gases	335	540	795	1,265	2,100
Chemicals	25	60	105	185	550
Total	$1,650	$2,175	$2,800	$3,800	$6,500

TABLE 4. EOR expenditures by supplier group (1978-88), in millions

Supplier group	1978	1984	1988
Service vendors	$ 800	$1,225	$1,875
Oil tool manufacturers	305	800	1,475
Tubular goods manufacturers	185	325	500
Subtotal	$1,290	$2,350	$3,850
Chemicals manufacturers	$ 15	$ 125	$ 400
Injection gases	335	1,265	2,100
Captive chemicals	10	60	150
EOR Total	$1,650	$3,800	$6,500

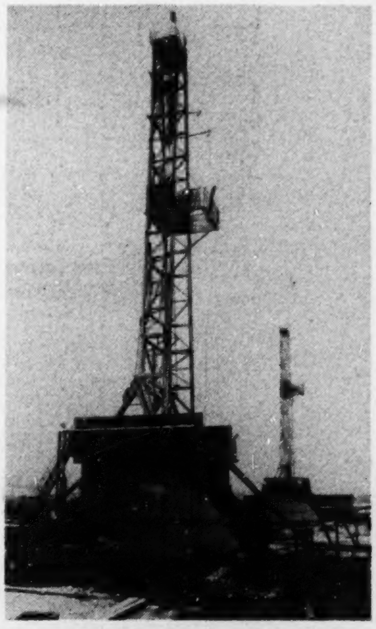
41% in 1988. The expected average annual (compound) growth rates in these EOR classifications are:

- Oilfield services, 9%.
- Oilfield equipment, 15%.
- Injection fluids, 22%.
- Total growth rate, 15%.

In the oilfield services category, other drilling and completion services is expected to be the high-growth component. Other equipment, including fluid-separation equipment, steam generators, and surveillance and control systems, is expected to be the principal growth component under oilfield equipment.

And, injection chemicals are expected to increase their share of the injection fluids total to 21% in 1988, up from 7% in 1978. Nitrogen and carbon dioxide are expected to account for the bulk of the expenditure growth under injection gases.

The overwhelming share of oilfield services and equipment used in enhanced oil recovery projects are traditional oilfield products supplied by traditional oilfield vendors. Frost & Sullivan, therefore, expect all of the suppliers active in the larger oilfield market to participate also in the enhanced recovery submarket. Table 4 shows distribution of the projected EOR expenditures by supplier group for the 1978-88 period.



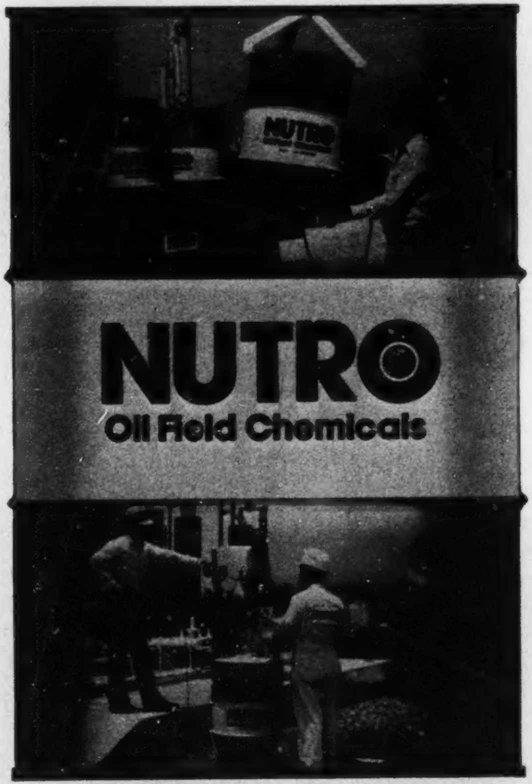
TRG 10, TRG Drilling Corp.'s first 30,000-ft drilling rig, is shown being rigged-up prior to the recent unveiling ceremonies at the TRG yard in Oklahoma City. Rig in the background is a more-conventional rig that TRG is building to drill to depths of up to 20,000 ft.

TRG Drilling Adds Ultradeep Rig

TRG Drilling Corp. unveiled its first ultradeep drilling rig recently at rig-up ceremonies in Oklahoma City, Okla. The rig, TRG 10, stands more than 180 ft high and is capable of drilling to 30,000 ft.

Equipped with a Gardner-Denver 3000E drawworks and a 152-ft Pyramid derrick with 2-million-lb capacity, the rig was constructed by TRG at a cost of about $7.5 million. It is contracted to work first for Mesa Petroleum Co. in western Oklahoma's Anadarko Basin, to where it was moved, following the rig-up ceremonies, on the backs of more than 60 flatbed trailer trucks.

BOP equipment on the big rig includes a Shaffer 13⅝-in. 10,000-psi LWS with Hydril six-station, 165-gal closing unit with 4-in. 10,000-psi manifold. An SCR rig, TRG 10 is powered by three Caterpillar D-399 TA engines



NUTRO KNOWS how to develop the right chemical program for you

Nutro has thirty years of experience in helping producers keep profits up and costs down with products and programs that really **work.**

That's only one of the reasons Nutro knows best how to control corrosion, scale and paraffin, how to do the most efficient job of emulsion breaking and how to give you the kind of service that keeps on solving your production problems year after year.

Get to know Nutro. Let us show you how much we know about oil field chemicals. P. O. Box 21187, Houston, Texas 77026. 713/675-3421, Telex 791-129 Nutro Hou. Cable: OILCHEM

NUTRO Products Corporation

Agent Inquiries Invited Domestic & International

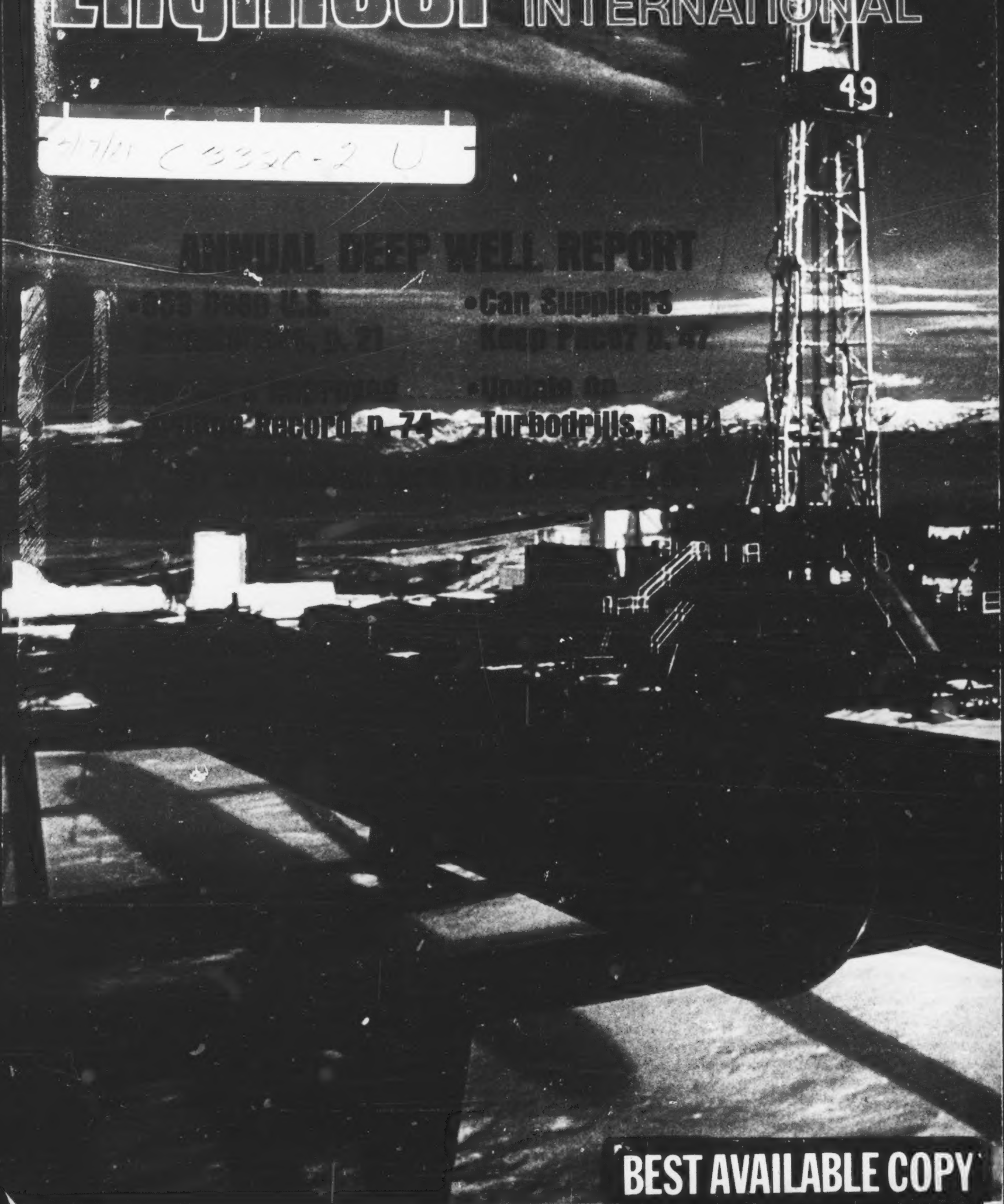
Circle 255 on Reader Service Card

Petroleum Engineer INTERNATIONAL

4/7/01 C3320-2 U

ANNUAL DEEP WELL REPORT

- •[illegible] Deep U.S. [illegible], p. 21
- •[illegible] Improved [illegible] Record, p. 74
- •Can Suppliers Keep Pace? p. 47
- •Update On Turbodrills, p. 114



BEST AVAILABLE COPY

U.S. Drillers Keep The Pace

Rotary drillers in the U.S. are maintaining the pace that led to record-breaking totals last year, according to rig counts issued each week by Hughes Tool Co., Houston, Tex.

Average rig activity through the middle of last month averaged 3,415, which is 499 rigs above the overall average for 1980. Canadian drillers are represented by respectable totals in the accompanying table, but their average so far this year is just one rig higher than 1980's yearlong average of 403.

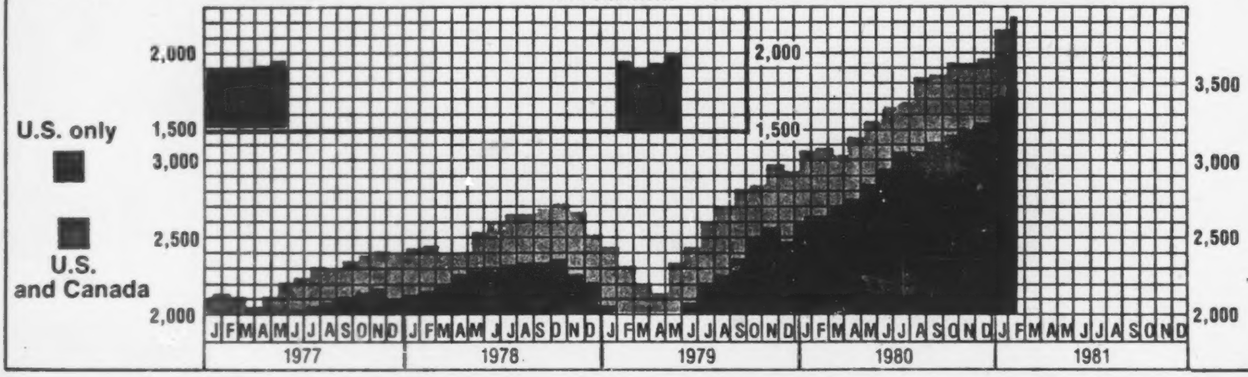
In the U.S. meanwhile, no fewer than eight states have rig counts that are in three figures, with Texas way out in front with solid four-figure totals. In addition, four Texas districts are in triple figures.

Oklahoma is the second-most active drilling state, and its count is steadily approaching 600.

Rotary Rigs Actually Making Hole In United States & Canada

As Reported to International Association of Drilling Contractors by Hughes Tool Company

	Jan. 19, 1981	Jan. 26, 1981	Feb. 2, 1981	Feb. 9, 1981
Alabama	14	13	16	12
Alaska				
Land	24	24	24	24
Offshore	3	2	1	1
Arkansas	33	35	34	32
Arizona	1	1	1	1
California				
Land	117	117	122	122
Offshore	21	21	18	18
Total	138	138	140	140
Colorado	64	81	63	67
Florida	6	6	4	8
Georgia				
Land	1	1	1	0
Hawaii	0	0	0	1
Idaho	1	1	1	1
Illinois	30	30	30	30
Kansas	171	172	173	173
Kentucky	3	3	3	3
North Louisiana	50	51	56	56
South Louisiana				
Inland Waters	75	74	81	79
Land	163,	176	180	172
Offshore	136	135	132	140
Total	424	436	449	447
Maryland	1	1	1	1
Michigan	35	35	34	34
Mississippi	64	65	59	64
Montana	71	78	84	80
Nebraska	14	5	10	11
Nevada	10	7	8	6
New Mexico	131	126	127	127
New York	10	10	11	11
North Dakota	105	107	104	106
Ohio	94	94	92	93
Oklahoma	527	536	551	564
Oregon	1	1	1	1
Pennsylvania	30	30	27	27
Rhode Island				
Land	1	1	1	1
Offshore	2	2	2	2
South Dakota	2	2	2	2
Texas				
Offshore	78	76	74	73
Dist. 1	62	56	58	62
Dist. 2	54	56	46	49
Dist. 3	191	202	211	210
Dist. 4	110	109	114	120
Dist. 5 & 6	134	138	137	138
Dist. 7B	69	71	79	80
Dist. 7C	84	86	82	78
Dist. 8	122	122	136	136
Dist. 8A	80	75	67	75
Dist. 9	77	76	75	77
Dist. 10	47	46	46	44
Total	1108	1113	1125	1142
Utah	63	65	64	64
Virginia	1	1	1	1
Washington	1	1	1	1
West Virginia	36	36	38	39
Wyoming	171	175	168	178
Total U. S.	3391	3434	3451	3495
Western Canada	435	422	429	444
Eastern Canada	4	4	4	4
U. S. and Canada	3830	3860	3884	3943



PETROLEUM ENGINEER INTERNATIONAL • 800 Davis Building • Dallas, Texas 75202 • **TWX** 910-861-9306

Abbott Sparks	President
John G. Grant	Publisher and Vice President
W. B. Bleakley	Editor
Richard D. McNally	Associate Editor
Steven D. Moore	Technical Editor
Mary Jane Ellis	Assistant Editor
Laura Jacobus	Assistant Editor
Edna Taylor	Editorial Assistant
J. E. (Hank) Kastrop	Consulting Editor
Renn Rothrock, Jr.	Consulting Editor
Ernestine Adams	Editor, Energy Management Rpt.
Julie Fonner	EMR Assistant Editor
Gregory Martin	Editor, Energy News/Energy Week
Sharon Hutcheson	Editorial Assistant
Alan Hilton	Service R&D Manager
Denise Tevis	Service R&D Department
Olga Dunn	Reader Service

ADVERTISING SALES OFFICES

EASTERN: Richard Martin, P.O. Box 89, Tennent, New Jersey 07763, (201) 446-3230

CHICAGO 60646: Bill Facinelli, Dwain Holmgren 4761 West Touhy Ave., Lincolnwood, Illinois (312) 679-1100

OHIO, WESTERN PA.: Dwain Holmgren, 4761 West Touhy Avenue, Lincolnwood, Illinois (312) 679-1100

LOS ANGELES 91106: Bruce Berkey, 61 S. Lake Ave., Box 4566, Pasadena, Calif., (213) 681-0685

HOUSTON 77027: Jess Adkins, Vice Pres., Gulf Coast Regional Manager, **Berry Biklen, Hal Odum,** 4151 Southwest Freeway, Suite 115, (713) 626-7850

DALLAS 75202: Ed Sealey, 800 Davis Bldg., (214) 748-4403, TWX 910-861-9306

WEST TEXAS: Rusty Meador, P.O. Box 611, Eldorado, Texas 76936 (915) 853-2569

UNITED KINGDOM, NETHERLANDS, SCANDINAVIA: Bryan Clark, Energy Publications Div. HBJ, 24/28 Oval Road, London NW1 7DX, England, (01) 485-7074 (OR 7075). Cable: HARBREX London NW1: Telex: 25775

FRANCE, ITALY, BELGIUM, SWITZERLAND: Gerard Lasfargues, 32, rue Desbordes Valmore, 75016-Paris, France, Telephone: 504 97 94

JAPAN: Mashy Yoshikawa, Orient Echo, Inc., 11th Floor Sankyo Bldg., 7-12 Tsukiji 2-chome, Chuo-ku, Tokyo, Telephone: 541-4923, Cable: MYORIENTECHO

GERMANY, AUSTRIA: S.I.P.A.S., **Wim. J. M. Sanders, Paul J. Verbunt,** Raadhuisstraat 24, P.O. Box 25, 1484 EN Graft-de Ryp, Holland, Telephone 02997-1303 and 3660. Telex: 13039 sipas nl, Telegrams: SIPAS-Amsterdam

Jane Dietz	Production Department Manager
Don Fickert	Graphics Director
Janell Fowler	Production Manager
Debbie Cooper	Production Coordinator
Dennis Howard	Presentation
Laura Page	Presentation
James Duke	Presentation
Victoria Valentin	Presentation
Gary Hogan	Business Manager
Jack Schabel	Circulation Director
Royal Courtney	Circulation Fulfillment Manager

ENERGY PUBLICATIONS
• a Division of Harcourt Brace Jovanovich •
P.O. BOX 1589 • 800 DAVIS BUILDING
DALLAS, TEXAS 75221 • (214) 748-4403

PETROLEUM ENGINEER INTERNATIONAL
Pipeline & Gas Journal
Energy Management Report
Energy News • Energy Week

HBJ A HARCOURT BRACE JOVANOVICH PUBLICATION

ABP

ABC

EDITORIAL ADVISORY COMMITTEE
Lloyd E. Elkins, Petroleum Consultant
Bennie L. Franks, President, Sun Texas Co.
Dennis E. O'Brien, Technology Section Head, Exxon Chemical Company
B. R. Jones, President, Eagle Production and Drilling Co.
Frank Schuh, Director of Engineering Development, ARCO Oil and Gas Co., a Division of Atlantic Richfield Co.
Marius J. Mes, Senior Research Scientist, Production Research Department, Conoco Inc.

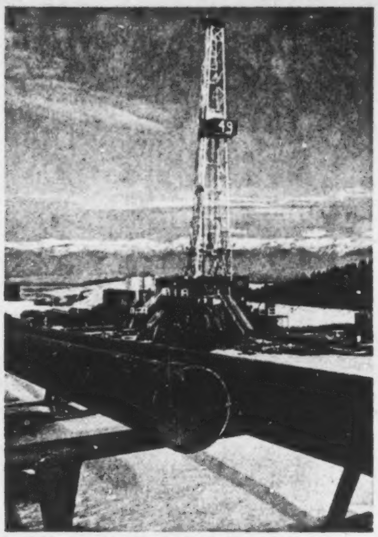
PETROLEUM ENGINEER INTERNATIONAL (USPS 429-380) published 15 times each year, monthly plus March 15, July 15 and November 15, by Energy Publications Division, Harcourt Brace Jovanovich, P.O. Box 1589, Dallas, Texas 75221.

January, 1981, Volume 53, No. 2. Copyright© 198´ by Harcourt Brace Jovanovich, Inc. All rights reserved. No part of this publication may be transmitted or reproduced in any form or by any means, electronic or mechanical, including photocopy, recording, or any information storage and retrieval system, without permission in writing from the publisher. Subscription rate to personnel employed by companies involved with exploration, drilling, production, or field processing of oil or gas: one year $12.00, two years $18.00, three years $24.00 for North, Central, and South America. Outside North, Central, and South America: one year $25.00, two years $35.00, three years $45.00. Subscription rate for all others: $25.00 for one year. Single copy price $3.00. Entered as second class mail matter January 15, 1949, at the post office in Dallas, Texas, under the act of March 3, 1879. Microfilm copies are available through University Microfilms, Inc., 313 North First Street, Ann Arbor, Michigan. Indexed by Applied Science, Technology Index and the Engineering Index, Inc.

Postmaster: Send address changes to PETROLEUM ENGINEER INTERNATIONAL, P.O. Box 1589, Dallas, Texas 75221, USA.

HARCOURT BRACE JOVANOVICH PUBLICATIONS

ROBERT L. EDGELL, Chairman; RICHARD MOELLER, President; LARS FLADMARK, Executive Vice President; ARLAND HIRMAN, Treasurer; JOE BILDERBACH, Vice President; JAMES GHERNA, Vice President; GEORGE GLENN, Vice President; THOMAS GRENEY, Vice President; EZRA PINCUS, Vice President; HARRY RAMALEY, Vice President; ABBOTT SPARKS, Vice President. OFFICES: 757 Third Avenue, New York, N.Y. 10017. Phone (212) 888-4444; 1 East First Street, Duluth, Minnesota 55802. Phone (218) 727-8511. 111 East Wacker Drive, Suite 1730, Chicago, Ill. 60601. Phone (312) 938-2300.



ABOUT THE COVER: With the Grand Tetons as a backdrop, Bomac Drilling Co.'s Rig 49 drills in the remote Overthrust Belt. (Photo courtesy of W. R. Grace & Co.)

NEXT ISSUE: The Ocean Technology Report on March 15 will look at the continuing trend toward operations in more-hostile waters.

(Note: In our description of the cover for the February 1981 issue, we neglected to mention that the photo was supplied by Sun Gas Co.)

Petroleum Engineer® INTERNATIONAL

The international magazine of methods for engineering/operating people
MARCH 1981 NUMBER 3 VOLUME 53

DEEP WELL REPORT

Deep Wells, Costs At Record Levels In 1980 21
by Rich McNally, Associate Editor, and Mary Jane Ellis, Assistant Editor

Drillers Topple Ultradeep Totals 32

Deep Well Map 37

Will Demand Outstrip Supply In '81? 47
by Steven D. Moore, Technical Editor

Modern Production Risers—Part 6 62
by George W. Morgan, Engineering Consultant

USSR Improves Drilling Record 74
by L. N. Shadrin, All-Union Research Institute for Organization and Economics of Oil Industry

Hand-Held Calculators Augment Optimized Drilling Programs—Part 4 82
by Ben Siegel, Delta Drilling Co.

Well Completions And Workovers—Part 12 96
by L. Douglas Patton, Sargent Industries Inc., and W. A. Abbott, Great Eastern Energy and Development Corp.

Straight-Hole Turbodrilling Gains Favor In The U.S. 114
by Steven D. Moore, Technical Editor

Charts Help Avoid Vibration Problems 122
Staff Report

International Land Rig Locator R-1
Worldwide locations and operating specifications for close to 4,000 contract drilling rigs.

ENERGY management report™

by Ernestine Adams

Comment EM 1
Energy World Report EM 2
Financial Notebook EM 3
International Design/Engineering EM 4
Oil & Gas Professional Opportunities EM 5
New Products EM 11

EDITORIAL DEPARTMENTS

News Hi-Lites 1
Significant Happenings in Petroleum
Course of Oil 6
Deep Well Power
Technology Trends 8
Forecasts from Current Events
Offshore Technology 10
Biomass Studies
Petroleum Engineering Quiz 130
by Chapman Cronquist
Drilling/Exploration 134
High Temperature Well Logging
Industry Meeting Calendar 145
Petroleum Profiles 148
Five Minutes with Jim Gregath
Continuous Tables 157
Company News 160
Book Reviews 172
Professional Directory 172
Index to Advertisers EM 16

Deep Wells, Costs At Record Levels In 1980

by Rich McNally, *Associate Editor,*
and Mary Jane Ellis, *Assistant Editor*

U.S. deep drilling increased by almost 40% during 1980 as operators completed a record total of 859 wells that went to 15,000 ft or deeper. But they paid the price.

PETROLEUM ENGINEER INTERNATIONAL's annual Deep Well Report puts total cost of U.S. deep drilling (which had taken almost 40 years to reach the $1 billion/year level in 1977) at just under $4 billion last year. That is a 75% increase over 1979, and it can't all be traced to the 38% increase in number of deep wells because the cost per well rose by 26% in 1980. Deep wells last year cost an average of $4.56 million apiece to drill and complete.

For the purposes of this report, completions are defined as wells that have reached total depth, regardless of whether production equipment has been installed. In some instances, therefore, success ratios listed in the accompanying tables may be low. All wells that reached total depth in 1980 are included, although some of the ones listed as dry holes were still being tested as this issue went to press. Their classification, therefore, could change when final test results are in.

TABLE 1. U.S. deep drilling
Wells drilled to 15,000 ft or deeper

		1980 (859 wells)	1979 (621 wells)	1978 (600 wells)
Average well depth		17,178 ft	17,246 ft	17,140 ft
Average cost/well		$4,560 ($265.47/ft)	$3,599 ($208.68/ft)	$2,587 ($150.93/ft)
Average mud cost/well		$479 ($27.88/ft)	$414 ($23.99/ft)	$254 ($14.81/ft)
Average bits/well		31.6 (544 ft/bit)	29.7 (581 ft/bit)	29.2 (587 ft/bit)
Success ratio		53.8%	44.9%	47.3%
Wildcat success ratio		39.3% (433 wells)	27.4% (248 wells)	31.7% (303 wells)
Development success ratio		68.5% (426 wells)	56.6% (373 wells)	63.3% (297 wells)
Total costs:	Mud	$ 411,380	$ 256,962	$ 152,861
	Drilling	$ 3,266,302	$1,819,545	$1,180,168
	Completion	$ 593,843	$ 359,338	not reported
	Total	$ 3,917,118	$2,234,891	$1,556,638
	Total footage	14,755,480	10,709,644	10,352,560

(Cost in thousand dollars except dollars per foot)

In a record overall drilling year that saw total footage drilled in the U.S. increase by 10.7%, deep well footage was up 37.7%, despite a slight drop in the average depth of deep wells. Deep drilling accounted for 1.3% of all U.S. wells last year, but deep well footage comprised 5% of all footage.

On a state-by-state basis, Louisiana continues to be the leading deep drilling state, with its 304 deep 1980 wells accounting for 6% of all wells drilled in the state last year. Texas was the second leading deep well state, but its 186 deep wells accounted for only 0.9% of that state's completions. Oklahoma also was close to the national percentage, with 145 deep completions that accounted for 1.6% of the year's wells.

Louisiana's total includes 63 offshore deep wells, which gives the Pelican State the lead in that category, as well. Texas, the runner-up offshore, completed only 10 wells there in 1980. In all, there were 77 deep wells drilled offshore last year, and they cost an average of $7.4 million apiece. Total cost of deep drilling offshore came to $571 million.

New Jersey rounded out the deep activity offshore last year with four wells. This brings the number of deep wells drilled in the Baltimore Canyon area since drilling started there in 1978 to 16 — 12 of them dry holes. Total cost of the 16 wells is $248 million, or $15.5 million each. Deep wells offshore Louisiana and Texas, on the other hand, were completed at an average cost of $6.8 million last year.

Another active deep drilling state is Mississippi, which topped 100 deep completions for the first time in 1980, although it had come close in 1978 with 91 wells. Mississippi and Alabama continue to be the most economical states in which to drill deep, which may be why almost 20% of Mississippi's wells are deep. A more probable reason, however, is that they're drilling deep in Mississippi because that's where the Cretaceous and Jurassic gas formations lie. Another reason is that the success ratio for development drilling is pretty good — at least in Mississippi. Wildcatting in the two states is a chancy business — mostly because of the elusive nature of the deep Smackover.

The overall success ratio for deep drilling in the U.S. climbed back above 50% in 1980 after having been below that mark for 3 years. The success ratio for development wells (68.5%) was the highest it's been in 4 years, and so was the wildcat success ratio (39.3%).

Ultradeep wells — those drilled to 20,000 ft or deeper — also were successful more than half of the time last year. There were 81 ultradeep wells completed last year and, although they are included among the 859 deep wells discussed in this article, they are covered in a separate article in this issue of

BEST AVAILABLE COPY

Wells completed 15,000 ft and below by years of completion

Year	No. wells by date of completion	Explor-atory	Total producers	Average bits/well	Mud costs average	Well costs average	Average costs/ft	Total footage drilled	Average ft/well	New records Deepest well	New records Deepest producer
1938	1	1	1	–	–	–	–	15,004	–	15,004	13,175
1944	1	1	0	–	–	–	–	15,279	–	15,279	–
1945	3	3	0	222	–	–	–	63,480	15,870	16,655	–
1946	1	1	1	–	–	–	–	15,452	–	–	–
1947	8	8	1	181	$ 24,000	$ 570,000	$ 35.87	127,128	15,891	17,823	13,904
1948	7	6	2	303	28,000	551,000	34.34	112,329	16,047	–	14,255
1949	11	8	5	199	64,000	534,000	32.52	180,631	16,421	20,521	15,530
1950	5	2	3	181	63,000	557,000	36.72	78,565	15,713	–	–
1951	12	5	6	116	54,000	527,000	33.56	189,864	15,822	–	–
1952	25	17	9	138	66,000	549,000	34.77	396,850	15,874	–	16,012
1953	25	14	20	159	75,000	729,000	44.79	402,936	16,177	21,482	17,895
1954	56	30	31	117	92,000	651,000	40.87	892,021	15,929	–	–
1955	98	63	43	87	116,000	649,000	40.09	1,587,008	16,031	22,559	–
1956	155	77	78	89	122,000	683,000	42.18	2,510,050	15,988	–	20,745
1957	185	114	89	89	121,000	743,000	46.25	2,987,841	16,064	–	–
1958	197	136	100	79	107,000	692,000	43.18	3,171,762	16,019	–	–
1959	228	142	119	71	83,000	650,000	40.48	3,660,857	16,056	25,340	–
1960	242	134	136	66	86,000	675,000	42.50	3,858,622	15,945	–	–
1961	243	84	153	63	81,000	614,000	38.07	3,918,324	16,124	–	–
1962	254	74	130	63	92,000	654,000	38.00	4,414,300	17,000	–	–
1963	271	96	128	52	97,246	696,000	42.85	4,401,363	16,241	–	21,410
1964	308	141	150	51	95,507	653,256	39.33	5,115,938	16,610	–	21,793
1965	330	117	156	59	90,160	610,784	36.50	5,522,541	16,735	–	22,098
1966	388	130	149	71	84,007	727,996	42.20	6,693,785	17,252	–	22,483
1967	402	142	192	66.8	96,375	762,676	45.29	6,769,371	16,839	–	–
1968	406	150	194	65	100,305	889,991	52.13	6,931,232	17,072	–	22,790
1969	389	116	206	53.6	101,529	866,349	50.19	6,619,216	17,016	–	–
1970	381	168	189	53.7	117,874	999,343	57.87	6,579,870	17,270	25,600	–
1971	417	149	210	60.3	146,049	949,959	54.81	7,227,444	17,332	–	–
1972	506	230	290	43.6	103,507	919,484	54.21	8,513,278	16,963	30,050	22,548
1973	506	213	272	37.7	122,067	1,107,059	63.58	8,810,918	17,413	–	–
1974	446	220	258	36.9	168,426	1,456,522	84.08	7,726,058	17,323	31,441*	–
1975	410	191	190	37	197,279	1,901,017	109.80	7,098,330	17,313	–	–
1976	439	186	255	32.8	214,276	2,112,509	121.98	7,603,041	17,319	–	–
1977	476	233	233	30.4	221,490	2,205,954	127.58	8,230,040	17,290	–	26,566**
1978	604	306	288	29.2	253,082	2,577,216	150.60	10,299,285	17,140	–	–
1979	621	248	279	29.7	414,000	3,599,000	208.68	10,709,644	17,246	–	–
1980	**859**	**433**	**462**	**31.6**	**$478,906**	**$4,560,090**	**$265.47**	**14,755,480**	**17,178**	**31,441**	**26,566**

*This is the all-time record depth hole, completed in Oklahoma's Anadarko Basin in May 1974 by Lone Star Producing Co.

**Chevron USA established the record depth production mark in 1977 with completion of No. 1 Ledbetter in Wheeler County, Texas. Gage was 2,500,000 cfd from the Arbuckle at 23,427-26,518 ft.

PETROLEUM ENGINEER INTERNATIONAL.

Also featured in this issue of PEI is the annual Deep Well Map, which indicates that 159 operators were responsible for 1980's deep wells. This comes to an average of 5.4 wells per operator, but most operators were content with three or fewer wells during the year. Only one operator drilled as many as 40 wells, three were in the 30's range, and a fourth drilled 21 wells. The number of operators in 1980 was an increase of 31 over 1979.

Oklahoma, the third most active deep-drilling state, was also among the leaders in successful drilling, with only 40 of the state's 145 wells ending up in the dry category. One of the dry holes, however, was the Harrell No. 1-2, the year's deepest well. It was drilled to 26,500 ft by GHK Corp. in Washita County.

Deep drilling's bargain basement of 1980 appears to be New Mexico, where 86.7% of the year's deep wells were successful. Ten of 11 wildcats found success, as did three out of four development wells. And, average cost per well was lower than in any state except Mississippi and Alabama.

Most costly state for deep drilling, of course, continues to be Alaska. It is also one of the most unrewarding states. Alaska's 0 for 5 last year was topped only by California, which went 0 for 6. California's deep wells, however, cost only a little more than $3 million apiece. Deep drilling in Alaska is to the tune of $26.5 million/well.

Such comparisons are unfair, of course, because deep drilling in Alaska is something else. Extreme weather conditions, sensitivities of the environment, and special transportation and logistic requirements increase drilling costs considerably. In addition, drilling in such a frontier area calls for considerable coring and sampling for stratigraphic, geochemical, and paleontological studies, which must be charged to drilling costs. Other items included in Alaskan exploration budgets are barging of supplies, maintenance of base camps, and provision of independent communications networks and air support systems to service the remote drilling sites. Many of the same conditions prevail at drilling sites in the Baltimore Canyon offshore New Jersey, and they account for the high well costs there as well.

Nevada joined the ranks of deep well states last year, but, statistically, at least, it was not a particularly auspicious debut. The Sagebrush State's one deep well (almost an ultradeep well) was dry, and its cost was higher than the average for land wells in any of the 48 contiguous states.

Cost per well in Wyoming was only slightly lower than that for Nevada's well, but 81.6% of Wyoming's deep wells were successful.

Florida is another hospitable state for deep drillers. Success ratios there have been higher than 50% ever since 1977, and last year the state batted 1,000, with 4 for 4. Average cost per well in Florida in 1980 was only slightly higher than California's. Average mud cost in Florida was less than half of the national average, and bit usage was the lowest of any deep drilling state. All four Florida wells were development wells, and they averaged 16,043 ft in depth.

Nationally, what had been a steady decline in bits per deep well since the mid-1950s seems to have leveled off in the last two years, and may even be headed back up. In the 20-year stretch from 1957 to 1977, bit usage per deep well dropped 66% to prompt dreams of a Texas Rangeresque "one well, one bit" rate by the 1990s.

Stepped-up drilling in the rugged Overthrust Belt is receiving much of the blame for today's "one well, 31 bits" rate, but work currently underway on bit hydraulics and with artificial diamond inserts could turn the bit picture around again within the next few years.

Another continuing trend highlighted by the Deep Well Report is a steady increase in expenditures for drilling mud. From under $10/ft as recently as 1974, mud costs rose to more than $30/ft in 1980. Mud cost for a deep well in 1974 averaged $168,426. Last year, average mud cost/well came to $479,000.

Most credit for the surge in deep drilling activity in the U.S. during the past few years (from 604 in 1978 to 859 in 1980) has been given to the Natural Gas Policy Act of 1978 that removed price controls for gas produced from below 15,000 ft. This tipped the scale away from drilling for oil which, as we all know, had been under price controls since the early 1970s. President Reagan's decontrol of U.S. crude oil prices earlier this year, however, threatens to tip the scale back toward drilling for oil because wellhead prices for natural gas are much lower than oil prices on a Btu basis. As pointed out in ENERGY NEWS last month, the schedule of gas price decontrol set up by the 1978 Act promises some, but not all, gas may be decontrolled in 1985. This means gas is likely to get progressively cheaper in relation to oil during the next 4 or 5 years. Unless President Reagan also acts to decontrol gas prices, therefore, last year's 859 deep completions may be the high-water mark for some time to come. Given a choice between drilling for deep, uncontrolled gas or for uncontrolled oil at any depth, most operators now will opt for oil because the deep gasser will cost 10 times as much to drill and complete as will the average oil well.

Location of 1980 wells 15,000 ft and deeper

State	Wells	Average bits/well	Average cost/well	Average mud cost/well
Alabama	26	18.7	$ 2,365,384	$ 184,615
Alaska	5	89.4	26,555,600	1,003,400
California	6	61.5	3,105,000	468,333
Colorado	1	24.0	3,700,000	380,000
Florida	4	15.0	3,127,000	206,250
Louisiana*	304	33.6	5,244,901	626,680
Mississippi	113	23.6	2,736,345	253,318
Nevada	1	41.0	6,854,000	449,000
New Jersey	4	40.0	17,843,000	592,750
New Mexico	15	21.5	2,812,733	308,733
Oklahoma	145	29.5	4,049,386	363,186
Texas*	186	29.3	4,172,569	476,268
Utah	11	57.1	5,974,090	613,727
Wyoming	38	50.9	6,183,000	604,263

*Includes offshore

TABLE 2. Alabama deep drilling

Wells drilled to 15,000 ft or deeper

	1980 (26 wells)	1979 (25 wells)	1978 (20 wells)
Average well depth	17,475 ft	17,808 ft	18,429 ft
Average cost/well	$2,365 ($135.36/ft)	$2,273 ($127.66/ft)	$1,789 ($97.06/ft)
Average mud cost/well	$185 ($10.56/ft)	$202 ($11.33/ft)	$183 ($9.93/ft)
Average bits/well	18.7 (933 ft/bit)	18.4 (968 ft/bit)	19.5 (943 ft/bit)
Success ratio	30.8%	44%	45%
Wildcat success ratio	16.7% (12 wells)	11.1% (9 wells)	16.7% (6 wells)
Development success ratio	42.9% (14 wells)	62.5% (16 wells)	57.1% (14 wells)
Total costs: Mud	$ 4,800	$ 5,044	$ 3,661
Drilling	$50,106	$49,550	$23,692
Completion	$10,533	$ 6,895	not reported
Total	$61,500	$56,836	$35,772
Total footage	454,359	445,201	368,580

(Cost in thousand dollars except dollars per foot)

TABLE 3. Alaska deep drilling

All wells drilled to 15,000 ft or deeper

	1980 (5 wells)	1979 (1 well)	1978 (2 wells)
Average well depth	16,700 ft	20,102 ft	15,709 ft
Average cost/well	$26,556 ($1,590/ft)	$38,000 ($1,890/ft)	$17,700 ($1,126/ft)
Average mud cost/well	$1,003 ($60.08/ft)	$1,700 ($84.57/ft)	$526 ($33.49/ft)
Average bits/well	89.4 (187 ft/bit)	111.0 (181 ft/bit)	102.0 (154 ft/bit)
Success ratio	0%	0%	0%
Wildcat success ratio	0% (5 wells)	0% (1 well)	0% (2 wells)
Development success ratio	0% (0 wells)	0% (0 wells)	0% (0 wells)
Total costs: Mud	$ 5,017	$ 1,700	$ 1,052
Drilling	$121,098	$13,400	$21,000
Completion	$ 8,412	$ 0	not reported
Total	$132,778	$38,000	$35,400
Total footage	83,501	20,102	31,418

(Cost in thousand dollars except dollars per foot)

Note: PETROLEUM ENGINEER INTERNATIONAL has been analyzing U.S. deep drilling on an annual basis since 1944. Base data are acquired from various industry sources, including contract drilling companies and Petroleum Information Corp., Denver, Colo. Operating companies confirm the wells and, through a special arrangement with PEI, provide cost data on a confidential basis. Mary Jane Ellis compiled the data for this report, which was written by Rich McNally.

BEST AVAILABLE COPY

BEST AVAILABLE COPY

TABLE 4. California deep drilling
All wells drilled to 15,000 ft or deeper

	1980 (6 wells)	1979 (1 well)	1978 (3 wells)
Average well depth	16,515 ft	15,059 ft	18,459 ft
Average cost/well	$3,105 ($188.01/ft)	$1,500 ($99.61/ft)	$5,436 ($294.47/ft)
Average mud cost/well	$468 ($28.36/ft)	$230 ($15.27/ft)	$765 ($41.44/ft)
Average bits/well	61.5 (269 ft/bit)	50.0 (301 ft/bit)	63.0 (293 ft/bit)
Success ratio	0%	0%	0%
Wildcat success ratio	0% (6 wells)	0% (1 well)	0% (3 wells)
Development success ratio	0% (0 wells)	0% (0 wells)	0% (0 wells)
Total costs: Mud	$ 2,810	$ 230	$ 2,295
Drilling	$18,285	$1,500	$14,902
Completion	$ 151	$ 0	not reported
Total	$18,630	$1,500	$16,307
Total footage	99,091	15,059	53,377

(Cost in thousand dollars except dollars per foot)

TABLE 5. Colorado deep drilling
All wells drilled to 15,000 ft or deeper

	1980 (1 well)	1979 (0 wells)	1978 (0 wells)
Average well depth	15,000 ft	0	0
Average cost/well	$3,700 ($246.67/ft)	0	0
Average mud cost/well	$380 ($25.33/ft)	0	0
Average bits/well	24.0 (625 ft/bit)	0	0
Success ratio	100%	0	0
Wildcat success ratio	0% (0 wells)	0	0
Development success ratio	100% (1 well)	0	0
Total costs: Mud	$ 380		
Drilling	$3,100		
Completion	$ 600		
Total	$3,700		
Total footage	15,000		

(Cost in thousand dollars except dollars per foot)

TABLE 6. Florida deep drilling
All wells drilled to 15,000 ft or deeper

	1980 (4 wells)	1979 (7 wells)	1978 (12 wells)
Average well depth	16,043 ft	15,862 ft	15,929 ft
Average cost/well	$3,127 ($194.91/ft)	$2,678 ($168.80/ft)	$1,666 ($104.57/ft)
Average mud cost/well	$206 ($12.86/ft)	$160 ($10.06/ft)	$104 ($6.50/ft)
Average bits/well	15.0 (1,070 ft/bit)	13.6 (1,169 ft/bit)	12.6 (1,266 ft/bit)
Success ratio	100%	71.4%	50%
Wildcat success ratio	0% (0 wells)	0% (0 wells)	0% (4 wells)
Development success ratio	100% (4 wells)	71.4% (7 wells)	75% (8 wells)
Total costs: Mud	$ 825	$ 1,117	$ 1,242
Drilling	$ 9,671	$16,149	$17,865
Completion	$ 2,837	$ 1,694	not reported
Total	$12,508	$18,743	$19,987
Total footage	64,173	111,036	191,148

(Cost in thousand dollars except dollars per foot)

TABLE 7. Louisiana land deep drilling
All wells drilled to 15,000 ft or deeper

	1980 (241 wells)	1979 (179 wells)	1978 (153 wells)
Average well depth	17,378 ft	17,248 ft	17,135 ft
Average cost/well	$4,931 ($283.78/ft)	$3,707 ($214.94/ft)	$2,353 ($137.30/ft)
Average mud cost/well	$636 ($36.60/ft)	$496 ($28.77/ft)	$296 ($17.28/ft)
Average bits/well	33.9 (513 ft/bit)	31.9 (541 ft/bit)	30.6 (560 ft/bit)
Success ratio	43.2%	37.4%	43.1%
Wildcat success ratio	26.5% (132 wells)	12.3% (57 wells)	27% (74 wells)
Development success ratio	63.3% (109 wells)	49.2% (122 wells)	58.2% (79 wells)
Total costs: Mud	$ 153,300	$ 88,809	$ 45,315
Drilling	$ 977,781	$553,101	$241,174
Completion	$ 190,877	$ 99,332	not reported
Total	$1,188,491	$663,596	$359,957
Total footage	4,188,024	3,087,347	2,621,655

(Cost in thousand dollars except dollars per foot)

TABLE 8. Louisiana offshore deep drilling
All wells drilled to 15,000 ft or deeper

	1980 (63 wells)	1979 (40 wells)	1978 (20 wells)
Average well depth	16,342 ft	16,259 ft	16,554 ft
Average cost/well	$6,444 ($394.30/ft)	$5,032 ($309.49/ft)	$3,688 ($222.79/ft)
Average mud cost/well	$591 ($36.14/ft)	$497 ($30.58/ft)	$310 ($18.71/ft)
Average bits/well	33.3 (491 ft/bit)	28.5 (570 ft/bit)	30.0 (551 ft/bit)
Success ratio	41.3%	45%	45%
Wildcat success ratio	32.4% (37 wells)	11.8% (17 wells)	33.3% (9 wells)
Development success ratio	53.8% (26 wells)	69.6% (23 wells)	54.5% (11 wells)
Total costs: Mud	$ 37,211	$ 19,888	$ 6,195
Drilling	$363,904	$177,241	$57,078
Completion	$ 35,169	$ 22,546	not reported
Total	$405,959	$201,277	$73,763
Total footage	1,029,573	650,346	331,080

(Cost in thousand dollars except dollars per foot)

TABLE 9. Mississippi deep drilling
All wells drilled to 15,000 ft or deeper

	1980 (113 wells)	1979 (73 wells)	1978 (91 wells)
Average well depth	17,058 ft	17,025 ft	17,142 ft
Average cost/well	$2,736 ($160.41/ft)	$2,092 ($122.87/ft)	$1,746 ($101.87/ft)
Average mud cost/well	$253 ($14.85/ft)	$295 ($17.35/ft)	$159 ($9.29/ft)
Average bits/well	23.6 (724 ft/bit)	22.1 (770 ft/bit)	24.3 (707 ft/bit)
Success ratio	42.5%	42.5%	38.5%
Wildcat success ratio	20.8% (48 wells)	20.7% (29 wells)	14.3% (42 wells)
Development success ratio	58.5% (65 wells)	56.8% (44 wells)	59.2% (49 wells)
Total costs: Mud	$ 28,625	$ 21,559	$ 14,487
Drilling	$242,025	$116,537	$121,087
Completion	$ 64,421	$ 35,934	not reported
Total	$309,207	$152,700	$158,907
Total footage	1,927,570	1,242,808	1,559,922

(Cost in thousand dollars except dollars per foot)

TABLE 10. Nevada deep drilling
All wells drilled to 15,000 ft or deeper

	1980 (1 well)	1979 (0 wells)	1978 (0 wells)
Average well depth	19,562 ft	0	0
Average cost/well	$6,854 ($350.37/ft)	0	0
Average mud cost/well	$449 ($22.95/ft)	0	0
Average bits/well	41.0 (477 ft/bit)	0	0
Success ratio	0%	0	0
Wildcat success ratio	0% (0 wells)	0	0
Development success ratio	0% (1 well)	0	0
Total costs: Mud	$ 449		
Drilling	$6,854		
Completion	0		
Total	$6,854		
Total footage	19,562		

(Cost in thousand dollars except dollars per foot)

TABLE 11. New Jersey offshore deep drilling
All wells drilled to 15,000 ft or deeper

	1980 (4 wells)	1979 (7 wells)	1978 (5 wells)
Average well depth	17,028 ft	17,210 ft	17,230 ft
Average cost/well	$17,843 ($1,047.87/ft)	$13,044 ($757.96/ft)	$17,160 ($995.96/ft)
Average mud cost/well	$593 ($34.81/ft)	$604 ($35.11/ft)	$752 ($43.65/ft)
Average bits/well	40.0 (426 ft/bit)	55.4 (310 ft/bit)	50.0 (345 ft/bit)
Success ratio	25%	28.6%	20%
Wildcat success ratio	25% (4 wells)	28.6% (7 wells)	20% (5 wells)
Development success ratio	0% (0 wells)	0% (0 wells)	0% (0 wells)
Total costs: Mud	$ 2,371	$ 4,230	$ 3,760
Drilling	$66,372	$73,294	$73,100
Completion	$ 5,000	$18,015	not reported
Total	$71,372	$91,309	$85,800
Total footage	68,111	120,467	86,150

(Cost in thousand dollars except dollars per foot)

TABLE 12. New Mexico deep drilling
All wells drilled to 15,000 ft or deeper

	1980 (15 wells)	1979 (7 wells)	1978 (4 wells)
Average well depth	16,638 ft	16,198 ft	15,679 ft
Average cost/well	$2,813 ($169.05/ft)	$2,105 ($129.96/ft)	$1,854 ($118.22/ft)
Average mud cost/well	$309 ($18.56/ft)	$225 ($13.92/ft)	$140 ($8.91/ft)
Average bits/well	21.5 (775 ft/bit)	25.0 (648 ft/bit)	31.3 (502 ft/bit)
Success ratio	86.7%	71.4%	75%
Wildcat success ratio	90.9% (11 wells)	75% (4 wells)	66.6% (3 wells)
Development success ratio	75% (4 wells)	66.7% (3 wells)	100% (1 well)
Total costs: Mud	$ 4,631	$ 1,578	$ 559
Drilling	$34,630	$10,855	$5,560
Completion	$ 6,396	$ 3,881	not reported
Total	$42,191	$14,736	$7,414
Total footage	249,572	113,386	62,716

(Cost in thousand dollars except dollars per foot)

TABLE 13. Oklahoma deep drilling
All wells drilled to 15,000 ft or deeper

	1980 (145 wells)	1979 (127 wells)	1978 (100 wells)
Average well depth	17,221 ft	17,143 ft	16,975 ft
Average cost/well	$4,049 ($235.14/ft)	$3,201 ($186.70/ft)	$2,582 ($152.13/ft)
Average mud cost/well	$363 ($21.09/ft)	$366 ($21.33/ft)	$234 ($13.79/ft)
Average bits/well	29.5 (584 ft/bit)	29.2 (587 ft/bit)	28.5 (596 ft/bit)
Success ratio	72.4%	54.3%	58%
Wildcat success ratio	60.5% (43 wells)	48.7% (39 wells)	54.2% (48 wells)
Development success ratio	77.5% (102 wells)	56.8% (88 wells)	61.5% (52 wells)
Total costs: Mud	$ 52,662	$ 46,438	$ 23,407
Drilling	$460,533	$331,828	$192,492
Completion	$121,878	$ 65,735	not reported
Total	$587,161	$406,496	$255,369
Total footage	2,497,022	2,177,211	1,697,500

(Cost in thousand dollars except dollars per foot)

TABLE 14. Texas land deep drilling
All wells drilled to 15,000 ft or deeper

	1980 (176 wells)	1979 (101 wells)	1978 (152 wells)
Average well depth	17,382 ft	17,554 ft	17,276 ft
Average cost/well	$3,876 ($222.98/ft)	$2,956 ($168.39/ft)	$2,445 ($141.53/ft)
Average mud cost/well	$448 ($25.75/ft)	$329 ($18.76/ft)	$258 ($14.91/ft)
Average bits/well	28.3 (614 ft/bit)	25.9 (677 ft/bit)	27.0 (640 ft/bit)
Success ratio	64.8%	52.5%	50%
Wildcat success ratio	57.3% (103 wells)	38.5% (52 wells)	33.7% (83 wells)
Development success ratio	75.3% (73 wells)	67.3% (49 wells)	69.6% (69 wells)
Total costs: Mud	$ 78,767	$ 33,253	$ 18,363
Drilling	$560,170	$244,708	$162,594
Completion	$108,402	$ 50,093	not reported
Total	$682,172	$298,553	$223,168
Total footage	3,059,312	1,772,991	2,625,952

(Cost in thousand dollars except dollars per foot)

TABLE 15. Texas offshore deep drilling
All wells drilled to 15,000 ft or deeper

	1980 (10 wells)	1979 (4 wells)	1978 (0 wells)
Average well depth	16,569 ft	17,228 ft	0
Average cost/well	$9,393 ($566.89/ft)	$12,685 ($736.31/ft)	0
Average mud cost/well	$982 ($59.26/ft)	$1,053 ($61.11/ft)	0
Average bits/well	47.4 (350 ft/bit)	43.3 (398 ft/bit)	0
Success ratio	30%	25%	0
Wildcat success ratio	14.3% (7 wells)	33.3% (3 wells)	0
Development success ratio	66.7% (3 wells)	0% (1 well)	0
Total costs: Mud	$ 9,819	$ 4,211	
Drilling	$87,737	$40,577	
Completion	$ 6,188	$10,163	
Total	$93,926	$50,740	
Total footage	165,686	68,911	

(Cost in thousand dollars except dollars per foot)

BEST AVAILABLE COPY

TABLE 16. Utah deep drilling
All wells drilled to 15,000 ft or deeper

	1980 (11 wells)	1979 (3 wells)	1978 (4 wells)
Average well depth	17,137 ft	18,135 ft	[illegible]
Average cost/well	$5,974 ($348.60/ft)	$5,137 ($283.28/ft)	[illegible] ($147.33/ft)
Average mud cost/well	$614 ($35.81/ft)	$872 ($48.10/ft)	$210 ($13.75/ft)
Average bits/well	57.1 (300 ft/bit)	69.3 (262 ft/bit)	56.0 (273 ft/bit)
Success ratio	36.4%	0%	25%
Wildcat success ratio	22.2% (9 wells)	0% (3 wells)	25% (4 wells)
Development success ratio	100% (2 wells)	0% (0 wells)	0% (0 wells)
Total costs: Mud	$ 6,751	$ 2,617	$ 840
Drilling	$60,473	$11,494	$6,912
Completion	$ 3,723	$ 300	not reported
Total	$65,715	$15,412	$9,000
Total footage	188,511	54,405	61,088

TABLE 17. Wyoming deep drilling
All wells drilled to 15,000 ft or deeper

	1980 (38 wells)	1979 (45 wells)	1978 (35 wells)
Average well depth	17,013 ft	17,984 ft	17,292 ft
Average cost/well	$6,183 ($363.42/ft)	$4,886 ($271.63/ft)	$3,303 ($191.03/ft)
Average mud cost/well	$604 ($35.52/ft)	$551 ($30.63/ft)	$285 ($16.50/ft)
Average bits/well	50.9 (334 ft/bit)	43.1 (417 ft/bit)	44.5 (388 ft/bit)
Success ratio	81.6%	37.8%	62.9%
Wildcat success ratio	75% (16 wells)	28% (25 wells)	47.6% (21 wells)
Development success ratio	86.4% (22 wells)	50% (20 wells)	85.7% (14 wells)
Total costs: Mud	$ 22,962	$ 24,786	$ 9,992
Drilling	$203,583	$174,311	$ 89,990
Completion	$ 29,256	$ 44,750	not reported
Total	$234,954	$219,993	$115,614
Total footage	646,502	809,301	605,220

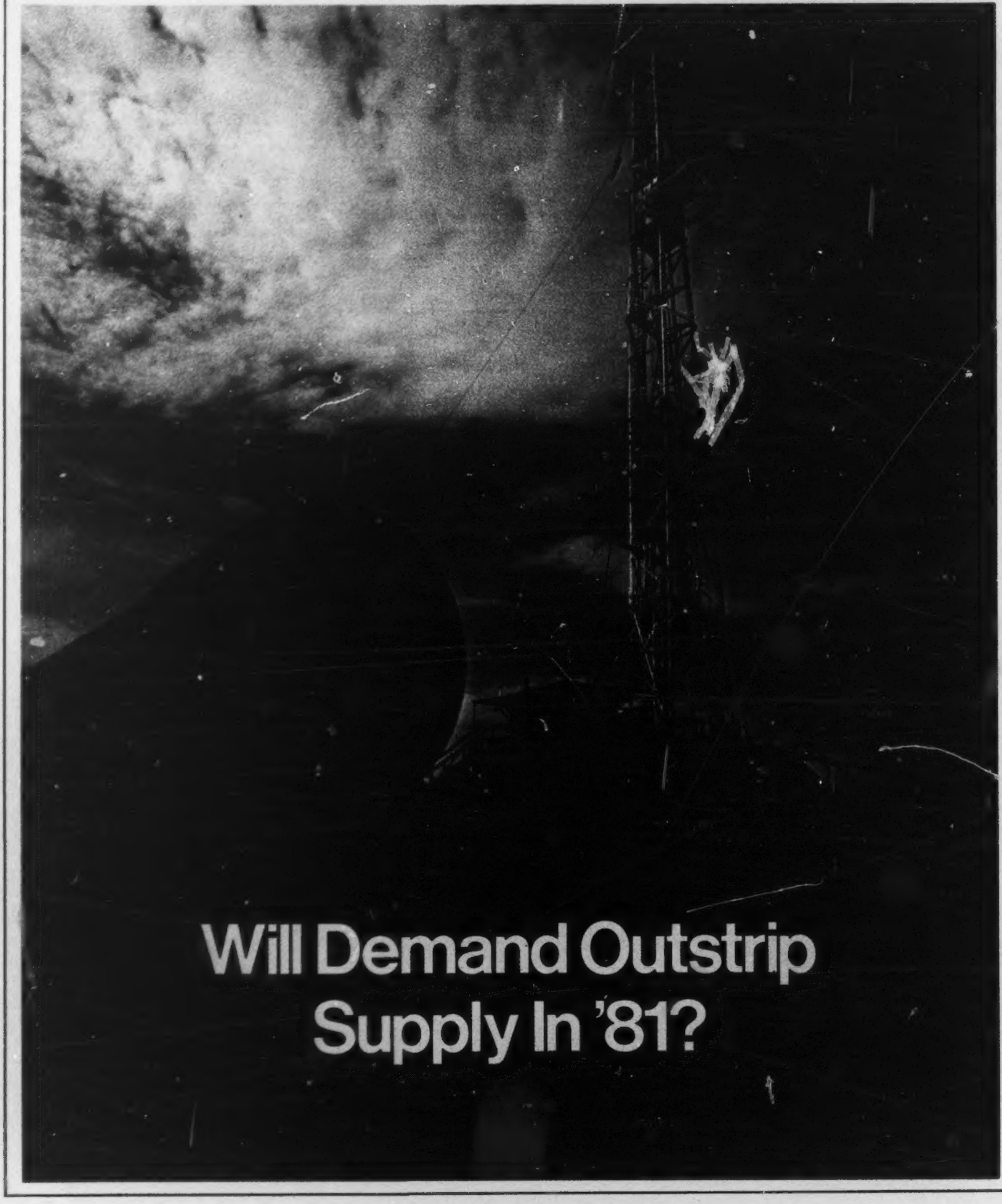
The following contractors (reported by the operating companies) drilled the wells analyzed in PEI's 1980 Deep Well Survey.

A & P Drilling Co. Inc.
Amoy Drilling & Well Service Corp.
Apollo Drilling & Exploration Inc.
Ard Drilling Co.
Arden Drilling Co.
ATCO Drilling Inc.
Pernie Bailey Drilling Co.
Baker & Taylor Drilling Co.
Bay Drilling Corp.
Big Chief Drilling Co.
Big-O-Drilling Inc.
Blocker Drilling Co.
Bomac Drilling
Bonray Energy Corp.
Brinkerhoff-Signal Inc.
L. D. Burns Drilling Co.
Butler Drilling Co.
Butler-Johnson Inc.
Buzzini Drilling Co.
Cactus Drilling Co.
Chase Drilling Co.
Circle Bar Drilling Co.
Cleveland Drilling Co.
Cliffs Drilling Co.
Core Drilling Co.
Culver Drilling Co.
Cyclops Drilling Co.
Decca Drilling Co.
Delta Drilling Co.
Delta Marine Drilling Co.
Diamond M Drilling Co.
Dixilyn-Field Drilling Co.
Dolphin International Inc.
Dual Drilling Co.
Eagle Production & Drilling Services Inc.
Eljay Drilling Corp.
Exeter Drilling Co.
Explorer Drilling Co.
Field Drilling Co.
Fluor Drilling Services Inc.
Forster Drilling Co. Inc.
Fortune Exploration Co.
Forwest Inc.
F W A Drilling Co. Inc.
Glasscock Drilling
Global Marine Inc.
Globe Drilling Co. Inc.
Goldrus Drilling Co.
Grey Wolf Drilling Co.
Griner Drilling Service Inc.
Edward Hall
Harkins & Co.
Harper-Turner Drilling
M.R. Harvey
Helmerich & Payne Inc.
Maxwell Herring Drilling Co.
W. B. Hinton Drilling Co. Inc.
Houston Offshore International Inc.
Intrepid Drilling Corp.
Jernigan Drilling Co.
L. E. Jones Drilling Co.
Justiss Mears Oil Co. Inc.
Keydril Co.
Lama Drilling Co.
Larco Drilling Co. Inc.
Dan Lester Drilling Co. Inc.
Loffland Brothers Co.
Lord Drilling Co. Inc.
McVay Drilling Co.
Mallard Well Service Inc.
Marine Drilling Co.
Marion Drilling & Services Co. Inc.
Marlin Drilling Co. Inc.
Mathieu Drilling Inc.
Mercury Drilling Co.
Merit Drilling Co.
MGF Drilling Co.
Montgomery Drilling Co.
Moran Bros. Inc.
E. W. Moran Drilling Co. Inc.
Moranco
Murco Drilling Corp.
Nabors Alaska Drilling Inc.
New & Hughes Drilling Co. Inc.
Nicklos Drilling Co.
Nicor Drilling Co.
Noble Drilling Corp.
Nova Drilling Corp.
Ocean Drilling & Exploration Co.
O'Conner & Young Drilling Co.
Ogden Oil Co. Inc.
O'Neal Drilling Co.
Parker Drilling Co.
Parker Well Service Inc.
Penrod Drilling Co.
Portal Drilling Co.
Power Rig Drilling Co. Inc.
Progress Drilling & Marine Inc.
Chesley Pruet Drilling Co.
Quarles Drilling Corp.
Rapad Drilling Co.
Reading & Bates Corp.
Resources Drilling Inc.
Restock Drilling Co.
Richards Drilling Co.
Rio Grande Drilling Co.
Robinson Brothers Drilling Co.
J. B. Roden Drilling Co.
Rosamond Drilling Co. Inc.
Rowan Drilling—U.S.
Salen Offshore Drilling Co.
Sanders Drilling Co. Inc.
Sands Drilling Co.
Santa Fe Drilling Co.
Sea Drilling Co. Inc.
Sedco Inc.
Dean Shanks
Sharp Drilling Co. Inc.
Southland Drilling Co. Inc.
Star Drilling Co. Inc.
Tasco Drilling Co.
Teledyne Movible Offshore Inc.
Tesoro Drilling Co.
Texaco Inc.
A. W. Thompson Inc.
Tiger Drilling Co.
Time Drilling Co.
Transworld Drilling Co.
TRG Drilling Corp.
Trigg Drilling Co.
True Drilling Co.
Two R Drilling Co. Inc.
Unit Drilling & Exploration Co.
United Drilling Co. of Tyler
Viersen & Cochran Drilling Co.
WellTech Inc.
Westburne Drilling Inc.
Western Oceanic Inc.
Wheless Drilling Co.
R. E. Williams Drilling Co.
Willis Drilling Co. Inc.
Fred Wilson Drilling Co. Inc.
Zapata Off-Shore Co.
Z-R Co.

BEST AVAILABLE COPY

OVERSIZE FOLDOUT(S) FOUND HERE IN THE PRINTED EDITION OF THIS VOLUME ARE FOUND FOLLOWING THE LAST PAGE OF TEXT IN THIS MICROFICHE EDITION.

SEE FOLDOUT NO 1-2



Will Demand Outstrip Supply In '81?

by Steven D. Moore, *Technical Editor*

The recent upswing in drilling activities has created some problems — a tight tubular market with possible spot shortages, a high demand for drilling rigs, and BOPs and bits in short supply. Although drilling mud materials should be adequate, except for an occasional logistics problem, an inrush of Canadian drilling rigs, and new drilling contractors entering the field every day, could strain the oilfield products market further.

Since pricing controls for most domestic crude oil were lifted, drilling has surged ahead. Activity could accelerate even faster if President Reagan's campaign promises are put into practice by Congress.

But does the U.S. have the equipment and service

TABLE 1. Comparative drilling figures for 1979 and 1980

	1979	1980	Increase, %
Active average rig count*	2,175	2,910	16.8
Total wells completed	49,101	62,704	27.7
Total new field wildcat wells drilled	6,777	7,317	8.0
Average well depth, ft	4,830	4,594	(4.9)
Average wildcat well depth, ft	6,062	6,106	0.7
Summary			
Footage, million ft	237.2	288.1	21.5
Estimated drilling and completion costs, $ billions	13.8	19.5	41.0
Success rate for all wells, %	67.7	72.0	
Success rate for wildcat wells only, %	18.7	19.9	

Source: 1. Petroleum Information Corp., except for active average rig count.
2.* Hughes Tool Co.

to support these ambitious drilling plans? In an industry already strained by spot shortages in supplies and manpower, is there room to grow?

Petroleum Information Corp. reported that a record 62,704 wells were drilled for oil and gas in the U. S. during 1980. That total eclipses the previous record of 57,111 wells drilled in 1956 and surpasses the number of wells drilled in 1979 by 13,603 — a 27.7% increase (Table 1).

On Jan. 2, 1980, the average rig count stood at 2,506; a year later it soared to 3,326. Hughes Tool Co. recently revised its 1981 U. S. rotary rig daily use forecast upward; instead of an average rig count of 3,200, as predicted in October 1980, Hughes Tool now estimates 3,400 rigs will be drilling for oil and gas in 1981 — a 16.8% increase over 1980's actual average rig count of 2,910, and a giant 55% increase over 1979.

Theoretically, with 35 to 45 rigs being built and absorbed into the drilling industry each month, and the possible influx of 100 or more rigs from Canada, the average rig count could go even higher. Assuming a 99% utilization rate in December 1981, the active daily rig count could be close to 3,800 rigs. To the cautious observer, this may seem somewhat high, but don't be surprised if the active rig count ends 1981 at nearly 3,600 rigs.

Anyone 2 years ago, or even last year, would have thought an average rig count of 3,400 ridiculous. But today that figure doesn't seem so farfetched — especially considering the funds available for wildcat and development drilling.

Record amounts of cash are budgeted by both major and independent oil companies for 1981 drilling programs. Also, the majors are allotting a bigger percentage of their working capital to domestic operations because of the stable and — for a change — favorable political climate. Even Canadian oil companies are pumping funds into the U. S., after the Ottawa government announced plans to nationalize the Canadian petroleum industry.

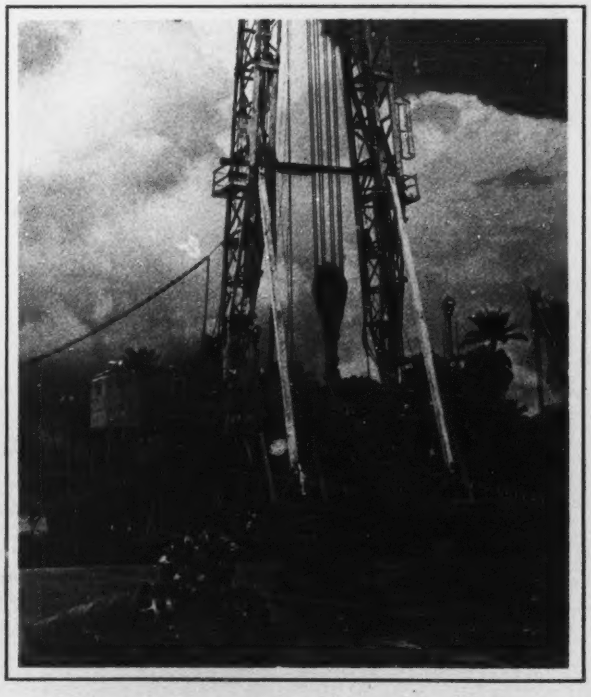
What this all comes down to is that drilling industry demand has not peaked yet. The big question is if the support industry can keep up.

Are Tubulars Running Short?

Oil country tubular goods were in tight supply all last year, with occasional spot shortages of high-grade pipe. Expect more of the same in 1981.

Inventories of most seamless carbon-grade tubulars remain adequate, as does production. Standard grades of pipe usually can be obtained without too much delay, but sometimes the wait stretches to as long as 3 months. The real shortage problem is for high-grade, alloy-steel pipe — particularly 9⅝-in. casing — where lag time for acquiring pipe may reach 5 to 9 months.

Demand for high-grade pipe stems from the quickening pace of deep drilling, where high-strength pipe is necessary for completing wells. Once, only the bigger oil companies could afford to drill deep wells, because of high drilling costs and relatively small profit margins. Now, with decontrol of natural gas below 15,000 ft and a greater return-on-investment, even smaller independents can participate in this high risk venture. Most forecasters feel that deep drilling will continue to increase over the next several years; however, without adequate supplies of high-grade pipe, growth may by stymied.

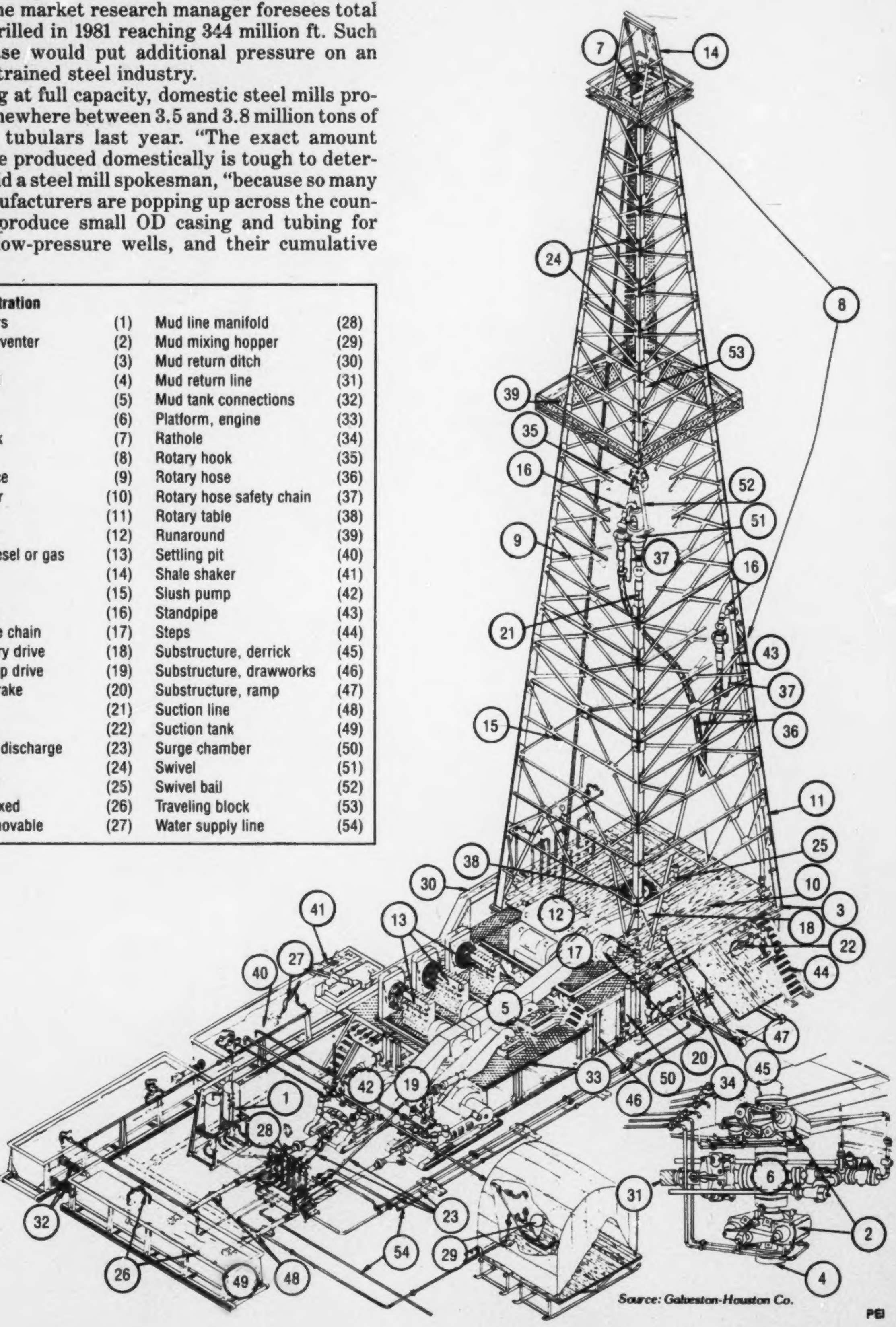


Total footage drilled in 1980 surpassed 288 million ft. One market research manager foresees total footage drilled in 1981 reaching 344 million ft. Such an increase would put additional pressure on an already-strained steel industry.

Working at full capacity, domestic steel mills produced somewhere between 3.5 and 3.8 million tons of seamless tubulars last year. "The exact amount of tonnage produced domestically is tough to determine," said a steel mill spokesman, "because so many little manufacturers are popping up across the country who produce small OD casing and tubing for shallow, low-pressure wells, and their cumulative

Key to illustration

Air chambers	(1)	Mud line manifold	(28)
Blowout preventer	(2)	Mud mixing hopper	(29)
Base plate	(3)	Mud return ditch	(30)
Casing head	(4)	Mud return line	(31)
Compound	(5)	Mud tank connections	(32)
Cross tee	(6)	Platform, engine	(33)
Crown block	(7)	Rathole	(34)
Derrick	(8)	Rotary hook	(35)
Derrick brace	(9)	Rotary hose	(36)
Derrick floor	(10)	Rotary hose safety chain	(37)
Derrick leg	(11)	Rotary table	(38)
Drawworks	(12)	Runaround	(39)
Engines, diesel or gas	(13)	Settling pit	(40)
Gin pole	(14)	Shale shaker	(41)
Girt	(15)	Slush pump	(42)
Goose neck	(16)	Standpipe	(43)
Guard, drive chain	(17)	Steps	(44)
Guard, rotary drive	(18)	Substructure, derrick	(45)
Guard, pump drive	(19)	Substructure, drawworks	(46)
Hydraulic brake	(20)	Substructure, ramp	(47)
Kelly	(21)	Suction line	(48)
Line, fill-up	(22)	Suction tank	(49)
Line, pump discharge	(23)	Surge chamber	(50)
Line, rotary	(24)	Swivel	(51)
Mouse hole	(25)	Swivel bail	(52)
Mud gun, fixed	(26)	Traveling block	(53)
Mud gun, movable	(27)	Water supply line	(54)



Source: Galveston-Houston Co.

PEI

production is hard to keep a tab on."

Regardless of the exact amount, domestic production will fall short of the 4.3 to 4.5 million tons of seamless tubulars expected to be consumed this year. The difference in supply and demand must be augmented by imported steel — mainly from Japan and Canada.

One steel company executive projects 1981 imports to reach 900,000 tons. A second source foresees imports in excess of 750,000 tons/year. But delivery schedules for some imports are lengthening, too, as demand for pipe increases worldwide — particularly in China, Latin America, and the Soviet Union.

If the prodigious rate of growth for the drilling industry is to continue, little, if any, steel — domestically produced or imported — can be put into inventory. Every available tubular good has immediate use. Fortunately, there has been very little hoarding of pipe — unlike the steel shortages of the early '70s — because of the continuing high interest and inflationary rates.

By late 1983 or early 1984, new manufacturing facilities will come on stream, easing this present plight. In the interim, the tubular goods market will remain tight; spot shortages of certain grades of pipe will increase in frequency and duration.

However, steel producers remain confident that they can still meet demand. As one spokesman put it, "There are no shortages for the people who plan carefully and place orders well enough in advance to secure the pipe they will need for future drilling."

Rigs Wanted

It seems that no one in the oilfield is too concerned about over-saturating the market with drilling rigs. In fact, new drilling contract firms are materializing nearly every day. Although the euphoria drilling contractors are experiencing appears to have no limit, eventually supply will outstrip demand.

But until then, operators will be put in the hot spot, searching for available rigs, and, in many cases, being required to sign a long-term contract before getting one. This doesn't put operators in the most enviable position, but, as one operator phrased it, "At least I know I'll have a drilling rig when I need it."

Demand for rigs is so high in the Overthrust Belt that most rigs will never leave. The same goes for the Williston Basin, where many of the Canadian rigs are relocating.

Drilling firms are expanding their fleets as fast as possible to keep up with the boom. TRG Drilling Corp. recently announced plans to acquire 18 new land rigs during 1981, bringing its fleet total to 104 rigs. Empire Oil and Gas Co. also is increasing its fleet size by purchasing 10 additional rigs. And the list goes on, with practically every drilling company included.

Rig manufacturers, like steel mills, are swamped with back orders. Lead time for construction is stretching out. One manufacturer said that lead time for constructing a rig ranges from 12 to 15 months. He also pointed out that as far as he could tell there is no slackening in demand.

Another rig company spokesman stated that lead time for his rigs, regardless of the size, was 10 months. Lead time would have been even longer if the firm hadn't opened two new construction facilities, he said. Most other manufacturers are reporting the same lead times, with an occasional longer wait for a deep-rated rig.

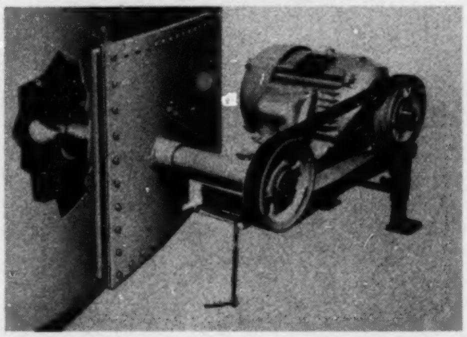
Backlogs for blowout preventers are excessive. A spokesman for one manufacturing firm said, "Delivery time for BOPs is 12 to 24 months, depending on the size and the pressure rating." Another source concurred, saying that orders for 1981 and half of 1982 were closed.

Surface mud equipment doesn't seem to be hard to find. One maufacturer said some equipment can be on location in a week, but most items require 60 to 90 days for delivery; a second manufacturer agreed, saying that all his equipment had lead times of 90 to 120 days, except for electronic devices that would require 32 weeks.

Extra mast and substructures have approximately the same lead times as drilling rigs, sometimes shorter in emergencies. Drawworks delivery time varies with the size required. A 1-year wait is usually a safe bet; larger drawworks will take longer. Rig prime movers and generators have minimum lag times of 6 months.

Pipe-handling equipment is running scarce, espe-

DECREASE COSTS, INCREASE PROFIT



FOR REFINERIES it will prevent stratification and assure uniform quality of process feed or product takeoff. With static free operation.

FOR PIPELINES it will clean the tanks with a payout of approximately 10 to 1 and will eliminate any buildup.

FOR PRODUCTION it will reduce the expense of heat and chemical, keep the oil moving without "turn down" slips and reduce B S & W down to 4/10 of 1%.

You will be pleased with the prompt service, simple installation, efficiency and economy of our equipment. We stock and sell direct or through your favorite supplier.

SMITH AGITATOR COMPANY
SUITE 531 FIRST-WICHITA NATIONAL BANK BUILDING
TELEPHONE 322-8601, WICHITA FALLS, TEXAS
Area Code 817 Zip Code 76301
Cable Code "MARPO"

cially casing and tubing tongs, slips, and elevators. Swivels and unions can take 9 to 12 months for delivery, high-pressure and H_2S service equipment having the longer lead times. Wire rope seems to be in adequate supply.

Too Few Bits

Rotary rock bits are in tight supply. No one is going without, but sometimes operators can't find the premium bit they planned to use and have to settle for second choice.

In the past, bit manufacturers required four backup bits for every bit sold. In other words, before a bit could be sold to a customer, four bits had to be either waiting in inventory, on the plant floor being manufactured, en route to the customer, or on the rig floor. With better manufacturing processes and facilities, and computer assistance, bit manufacturers have cut the required backup bits to a fraction over two. Now, because of demand, even this requirement is hard to maintain.

And don't expect relief anytime soon — not until additional manufacturing facilities are completed.

Supply of diamond bits is also tight. The biggest problem may not be availability, but price. With the rapidly escalating price of diamonds on the world market, diamond bit manufacturers are forced to raise their prices, too.

Supplies of bottomhole assemblies, drill collars, and kellys are similar to drill bits. Drillers are finding the supply tight as backlogs mount.

One manufacturer said that although demand has increased, he is confident that his company can handle any situation. He also pointed out that lead time for delivery will differ with size and weight of the equipment.

Assuming that total footage drilled this year increases 20%, supplies of mud and cement will have to increase by at least that much. This increase puts quite a burden on suppliers, who saw their business from 1979 to 1980 grow 30 to 35%. Although spot shortages will occur, supplies should be adequate. The recession in the construction and other related industries should help keep material shortages minimal.

People Problems

Maybe the most critical shortage in the oil industry today is the lack of qualified, experienced workers. Contractor and operator alike have been caught short. Not only is it a problem to find and keep good help, it's often a challenge just to find someone who is motivated and willing to work. Recession-caused unemployment may ease the shortages as new faces turn to the oil patch for jobs.

The oil industry's growth over the last 2 years has been dramatic. As a result, periodic shortages will occur as the support industry struggles to keep up. Until then, only careful planning can assure sufficient company inventory to keep rigs running. ■

PHILLIPS HAS THE PROCESS AND THE PRODUCT TO IMPROVE YOUR CATALYTIC CRACKER YIELDS.

The process: Phillips Petroleum Metals Passivation, another profit opportunity to industry from a recognized leader in U.S. and world patents. It's the easy, economical way to increase gasoline and distillate production from gas oils, reduced crudes, or other feedstocks containing heavy metals.

The product: Phil-Ad® CA, the proven metals passivation additive available to Phillips licensees of the process. Added to the oil feed in fluid catalytic cracking units, Phil-Ad CA passivates contaminant metals. The result is more high-valued products, plus increased throughput and feedstock flexibility.

The process and the product from Phillips: an unbeatable team. For licensing information, phone 918 661-7036. To order Phil-Ad CA, phone 800 858-4327 (in Texas, 800 692-4045).

PHILLIPS
66

PHILLIPS CHEMICAL COMPANY
A SUBSIDIARY OF PHILLIPS PETROLEUM COMPANY
The Performance Company

Circle 227 on Reader Service Card

FOAM STICKS FOR WATER REMOVAL FROM GAS WELLS

SLICK STICKS*
Foaming soap sticks
with friction reducer.

3 SIZES
1 5/8" x 18"
1 1/4" x 15"
5/8" x 15"

Available through supply stores

SELECT INDUSTRIES' INC.
Box 2450 Wichita Falls, Tex. 76307
Phone: (817) 322-1321

*Trademark: SELECT INDUSTRIES, INC.

Circle 228 on Reader Service Card

USSR Improves Drilling Record

by L. N. Shadrin,
All-Union Research Institute for Organization and Economics of Oil Industry, USSR

To increase current USSR oil and gas production, drilling efficiency must improve. The USSR Oil Ministry is using comprehensive statistical analyses to determine where inefficiencies lay and what improvements should be stressed.

According to data compiled between 1971 and 1974, capital invested into drilling exploratory and development wells accounted for an average 50% of the total investments budgeted to the oil industry. During the ensuing years, the percentage of capital invested in drilling programs decreased slightly, although the amount, in dollar figures, continued to climb.

Increases in the drilling budget were due to drilling activity growth, as well as a vast program of equipping drilling organizations with modern technology and tools and providing them with new special materials and chemicals.

Drilling Up

Statistics gathered from 1965 to 1978 showed a trend for rapid increases in the total annual footage drilled and the annual number of wells completed (Fig. 1). When exploratory and development drilling statistics are treated separately, it becomes obvious that the total increase in drilling was due mainly to the growth of development drilling. During these 13 years, total footage of development wells increased 2.23 times, while the volume of exploratory drilling gradually decreased.

Total annual footage drilled and number of exploratory and development wells completed by the USSR Oil Ministry increased, respectively, by 51.1 and 36.4% from 1970 to 1978, while the annual average number of drilling rigs was reduced.

During this 13-year period, development drilling improvements included:

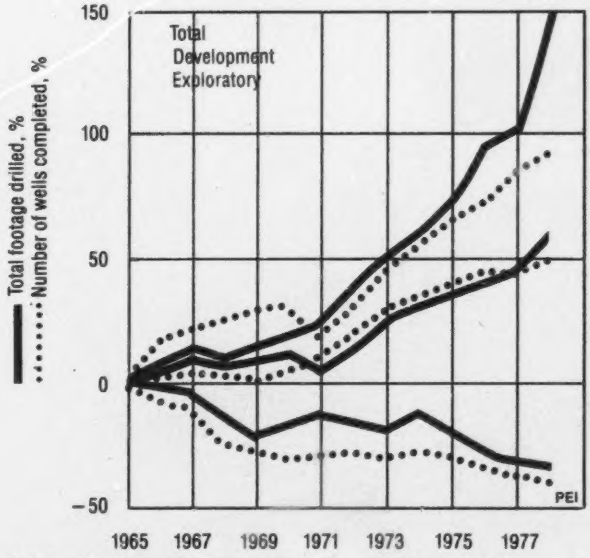


Fig. 1. Annual percent change of total footage drilled and number of wells completed.

- Average well depth increased from 5,814 to 6,542 ft (1,772 to 1,994 m).
- Overall drilling speed increased from 3,675 to 5,620 ft/drilling rig/month (1,120 to 1,713 m/drilling rig/month).
- Average footage bit increased from 113.1 to 249.7 ft (34.5 to 76.1 m).
- Penetration rate increased from 31.89 to 42 ft/hr (9.72 to 12.8 m/hr).

In the same period, exploratory drilling also improved:

- Average depth increased from 8,337 to 9,177 ft (2,541 to 2,797 m).

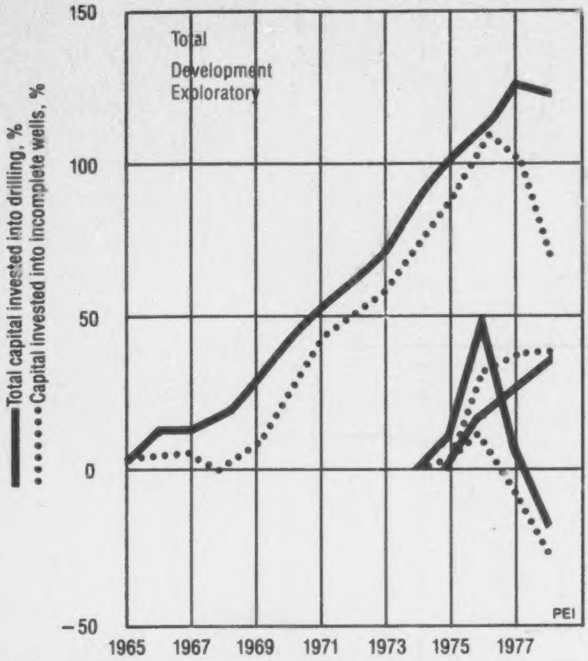


Fig. 2. Annual percent change of capital invested into drilling and capital invested into incompleted, or abandoned, wells. Statistics for exploratory wells gathered only after 1973; statistics for development wells gathered only after 1974.

- Overall exploration drilling speed increased from 1,112 to 1,338 ft/drilling rig/month (339 to 408 m/drilling rig/month).
- Average footage bit increased from 59.4 to 92.2 ft (18.1 to 28.1 m).

However, the penetration rate decreased from 10.43 to 9.71 ft/hr (3.18 to 2.96 m/hr).

Improvement of these performance statistics enabled the USSR's target of increasing profitability for drilling operations to be substantially exceeded. In 1975, drilling efficiency was increased 2.4 times (compared to that in 1970), while the oil ministry's target was only 1.5 times. The drilling plan as a whole was surpassed by more than 7.9 million ft (2.4 million m) of drilled footage and 2,700 completed wells.

Unfortunately, at the same time, the number of incompleted wells was growing rather intensely. The apex was reached in 1976, as investments in incompleted wells approached the level of annual capital invested into drilling (Fig. 2). The incompleted well ratio—the ratio of incompleted wells expenditures to capital invested in drilling—remained high throughout 1965 to 1976 (Fig. 3).

A radical change took place in 1977, when the USSR resolution to shorten drilling time by 25 to 30% was put into practice. Drilling departments of USSR oil industry took all possible measures to decrease the number of wells suspended before drilling, to shorten testing and completion times, to hasten decisions on suspension and abandonment of wells, as well as to shorten or exclude the suspension period before putting wells on production. These measures, along with continually equipping the drilling organizations with modern technology and equipment, made it possible to decrease the number of wells suspended before drilling and testing.

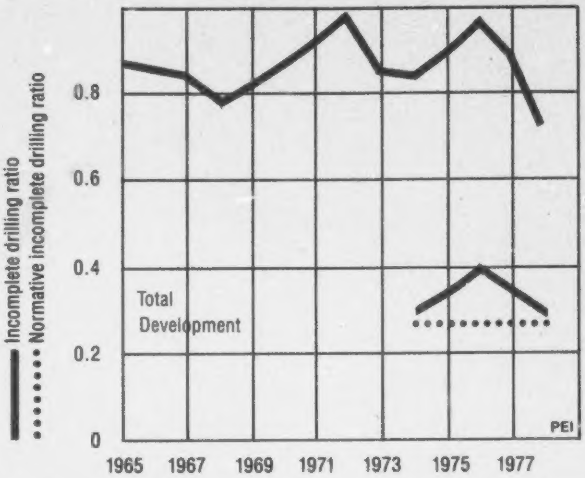


Fig. 3. Incompleted well ratio. Ratio is capital invested into incomplete, or abandoned, wells vs capital invested into total drilling operations. The normative ratio is the ratio the USSR Oil Ministry has set as a ratio to stay below.

As a result, drilling time for both development and exploratory wells was shortened, compared to corresponding figures for 1975. These achievements enabled the target to be reached ahead of time.

The trend for the decreasing incompleted wells surfaced after 1976, when the measures taken to decrease total drilling time had already produced the first results. If this trend continues, in 1 or 2 years the volume of incompleted wells will comply with the norm established by the oil ministry, which will be an important factor in ensuring effective planning, financing, and organizing of drilling operations.

Productivity Must Improve

Although drilling efficiency was improved, it should be noted that there are great possibilities of further improvement—specifically, and most important, productivity of labor.

Indeed, the annual changes in USSR drilling statistics show that unproductive times changed only insignificantly and lasted a long time. At the same time, a tendency for an increase of time losses due to poor management can be noted both in development and exploratory drilling.

In exploratory drilling, a trend can be noted toward increases in the time spent for eliminating drilling troubles and decreases in time spent for eliminating accidents and defects. Although actual time lost due to poor management in exploratory drilling decreased by 4% in 1977 compared to the corresponding 1970 figure, unproductivity remained high.

Productive time spent for secondary operations remains too long. Shortening this part of drilling operations is worth noting. In 1978, for instance, the time spent per 3,281 ft (1,000 m) of hole decreased by 31.2 and 15.8% (compared to 1970 figures) in development and exploratory drilling, respectively. But due to well depth increases, more complicated geologic conditions, and increase of directional well drilling in many regions, the time spent for electric logging, drilling tool orienting, mixing and treating of drilling muds, hole reaming to the nominal size, and other operations increased.

Nevertheless, there is a real possibility to reduce this time by further combining electric logging operations, using improved mud mixing, optimizing drilling hydraulics and reaming operations, speeding up blowout prevention equipment rig-up and pressure tests, and other secondary operations.

Analysis of a 24-hr drilling time distribution between 1970 and 1977 shows a trend for decreased drilling time. Operations involved in the actual drilling gradually decreased due to an increase in other operations in the total volume of work.

Since 1977, actual drilling time has increased slightly. Specifically, on-bottom time has increased gradually while tripping time has decreased.

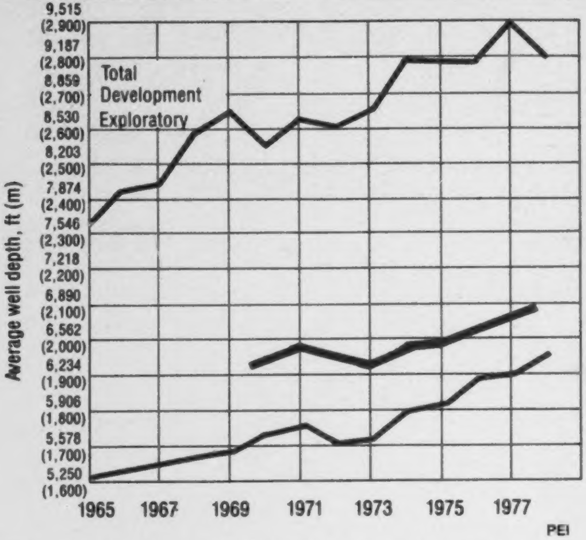
These results were attributed to improvements in the service life and efficiency of new drilling bits and downhole motors. However, the increase in drilling time is insignificant, pointing to the fact that improvement in the service life of drilling bits and downhole motors is offset, to a large extent, by time losses due to poor management and performing unproductive or low-efficiency secondary operations.

Drilling Costs Up

All of the above-mentioned factors contributed to increases in drilling costs. From 1965 until 1978, average well depth increased by 20.9 and 20% in development and exploratory drilling (Fig. 4), respectively, while the cost for 3.281 ft (1 m) of well increased by 74.5 and 87.4% respectively. The increase in drilling costs compared to the growth of the average well depth is somewhat disproportionate. Besides the increase in average well depths, there are complications of geology, subsurface temperature, pressure, and hydrodynamic conditions; also, drilling is gradually spreading to remote regions of Western Siberia, European North, and other poorly developed USSR regions.

Cost increases of preparatory operations for drilling 3.281 ft (1 m) of a development well increased from 3.1% in 1965 to 4.4% in 1970 and then to 12.1% in 1978; transportation expenses increased from 5.7 to 8.6% during the same period. The cost increases for these elements are associated with a sharp increase in the volume of preparatory operations and transportation services required to carry out enormous drilling programs in the hard-to-reach regions of the USSR. At the same time, actual drilling time reductions, as well as an increase in the drilling and completion rates, resulted from cost reductions associated with drilling equipment and tools used.

During the period analyzed, a decrease in overhead costs occurred for both development and exploratory wells. This is attributed to a reduction in administrative expenses in the process of uniting the drilling organizations of the USSR oil industry — a program to improve drilling processes and management in the late '60s and early '70s.



PEI

Fig. 4. Average well depth statistics for total wells gathered only after 1969.

The relationship between the elements of actual drilling costs changed to a lesser degree in exploratory drilling from 1965 to 1978. Apparently, this small increase was brought about by the reduction in exploratory drilling volume (Fig. 3). Also, in recent years, exploratory drilling was carried out mostly in old oil regions — additional exploration of oil pools and exploration of new fields.

Future Plans

These data suggest a great potential for improving the technical and economic considerations of drilling. This also is confirmed by the difference between the average labor productivity of the drilling crews and the corresponding productivity of advanced drilling crews of the same organizations (Table 1). For instance, the drilling crew of the Neftejugansk drilling department No. 2, led by toolpusher G.G. Skladchikov, drilled 171,915 ft/year (52,397 m/year)— and had a productive time percentage of 88.3%. At the same time, average development well productive time percentage in this drilling department was 45.4%, with footage per drilling crew of 128,562 ft/year (39,184 m/year). The advanced drilling crew is ahead of its drilling department in terms of overall drilling speed by about 3,281 ft/rig/month (1,000 m/rig/month).

Even greater differences can be seen in the performance of the drilling crew led by toolpusher M.P. Grin — 104,447 ft/year (31,834 m/year), with an overall drilling rate equivalent to 9,938 ft/rig/month (3,029 m/rig/month) and productive time of 94.8%. The average Aznakaev drilling department crews drill 79,170 ft/year (24,130 m/year), with an overall drilling speed of 7,307 ft/rig/month (2,227 m/rig/month) and productive time of 75%.

When drilling conditions are comparable, the difference in statistics is caused, to a large degree, by such factors as skill of the main crew members, per-

TABLE 1. Drilling ratings for different organizations, departments, and best drilling crews

Organization Drilling department Best drilling crew	Well type	Average well depth, m	Overall drilling rate, m/rig/month		Productive time, %	Average depth per crew
			Planned	Actual		
Juganskneftegaz	Development	2,566	3,551	2,419	56.3	33,743
Neftejugansk drilling department No.2	"	2,612	3,597	4,242	45.4	39,184
Crew of G.G. Skladchicov	"	2,620	3,817	5,241	88.3	52,397
Tatneft	"	1,652	2,129	2,095	74.4	22,364
Almetjev drilling department	"	1,619	2,090	2,057	75.5	23,008
Crew of D.M. Nurutdinov	"	1,673	2,380	2,869	90.3	31,025
Aznakaev drilling department	"	1,622	2,220	2,227	75.0	24,130
Crew of M.P. Grin	"	1,536	2,530	3,029	94.8	31,834
Embaneft	Exploratory	2,624	258	346	59.1	4,058
Balykshinsky drilling department	"	3,506	300	400	64.5	5,403
Crew of N.A. Kuznetzov	"	3,510	567	671	81.7	7,380
Ukrneft	Development	3,389	345	381	79.6	3,773
Poltava drilling department	"	3,882	376	447	79.6	3,545
Crew of V.A. Pylko	"	3,780	482	1,034	98.1	8,831
Azneft	"	1,908	550	516	70.2	5,511
Aly-Bairamly drilling department	"	2,100	674	495	67.5	5,042
Crew of A.A. Gasanov	"	2,150	500	942	98.4	7,532
Stavropolneftegaz	Exploratory	3,805	550	727	83.0	5,958
Neftekumsk drilling department	"	3,823	580	757	77.6	3,100
Crew of S.R. Rassiev	"	4,450	618	811	92.4	8,306
Uzbekneft	"	3,769	240	241	73.5	2,419
Andizan drilling department	"	4,542	240	271	85.6	2,776
Crew of T. Tursunov	"	4,490	346	432	93.0	4,490
Saratovneftegaz	"	4,032	200	210	53.2	1,829
Saratov drilling department	"	3,622	245	269	56.2	1,432
Crew of A.K. Shevchenko	"	5,000	351	453	92.2	3,350
Stepnovsk drilling department	"	2,842	166	164	47.3	1,116
Crew of P.K. Lomóvtzev	"	2,583	294	443	89.4	3,902
Niznevolzskneft	Development	2,023	706	689	71.0	6,622
Archedinsky drilling department	"	3,012	850	696	77.4	6,211
Crew of D.A. Rybalkin	"	3,170	798	844	83.1	9,063
Crenburgneft	"	2,391	1,225	1,306	75.6	11,768
Sorochinsky drilling department	"	2,481	1,133	1,281	74.4	12,161
Crew of A.I. Emeljanov	"	2,474	1,312	1,785	91.6	15,049
Komineft	"	2,615	795	791	71.2	7,843
Drilling department No.2	"	3,338	876	951	81.4	8,790
Crew of S.V. Melehin	"	3,272	883	1,433	95.0	13,129

manence of crew personnel, and coordination of crew efforts, moral unity, and working conditions for crew members.

A great difference in statistics between advanced and average crews is, to a certain degree, indicative of inadequate work supervision and weaknesses in the technological and service divisions responsible for drilling support. Conditions for continuous drilling often are created by the leaders of the advanced crews themselves. They undertake functions which are not fully performed by the administrative staff and service divisions of the drilling department. In this sense, better management responsibility for the effective work of all drilling crews should be a dependable factor in raising crew output.

Technological improvements for drilling in the USSR should be aimed at better selection of surface drilling and power-generating equipment, type and size of drilling bits, downhole motors, drill string components, casing and other oilfield tubular goods, wellhead equipment, etc. Other technological improvements should include:

- Better substantiation of drilling practices.
- Improved methods and technology to control and maintain structural and mechanical properties of drilling muds by chemical treatment and timely mechanical cleaning.
- Regulation of hydrodynamic pressure on the hole bottom and walls.
- Optimization of round-trip and casing running speeds, drilling hydraulics, and cementing practices.
- Prevention of drilling troubles and accidents.

Organizational improvements should include:

- Better project and financial documentation.
- Reliable technological, transportation, and information services.
- Timely services of specialized subcontract organizations.
- Taking all measures to provide qualified personnel, to improve qualifications of engineers and technicians, and to organize special training and educational work. ■

Acknowledgement. This article was adapted from an article printed in the Soviet magazine *Neftjanoye Hoziajstvo* (May 1980) No. 5, 14-20.

$9 Billion To Tap Unconventional Gas

Production from unconventional gas sources will become increasingly attractive in the 1980s and indispensable to maintaining viable reserve levels in the 1990s, according to a research report by Frost & Sullivan Inc. of New York.

As a result, demand for the drilling equipment, supplies, and services required to tap unconventional gas will build continuously through the balance of this century, says the 248-page study entitled "Unconventional Gas Production and Associated Equipment Markets".

As the boundary between conventional and unconventional sources blurs, the demand for drilling and production equipment will reach first to $1 billion (1985) and then leap to $9.6 billion in 1990 (in 1980 dollars). The demand for services will increase in the same period from $583 million to $3 billion.

Outlays for specific categories of equipment and services will be as follows:

(Millions of 1980 $)			
Equipment	**1985**	**1990**	**2000**
Drilling rigs	$628	$1,717	$4,101
Drill string components	48	132	316
Tubular goods	14	39	95
Production equipment	311	1,430	4,930
Production rigs (wireline)	32	80	160
Services			
Wireline services	275	350	667
Well workover	35	79	240
Well treatment	273	342	2,097

In one other sector, that of drilling fluids, tight supplies are expected to bring dramatic price increases, estimated at a rate nearly 10% higher than that of inflation.

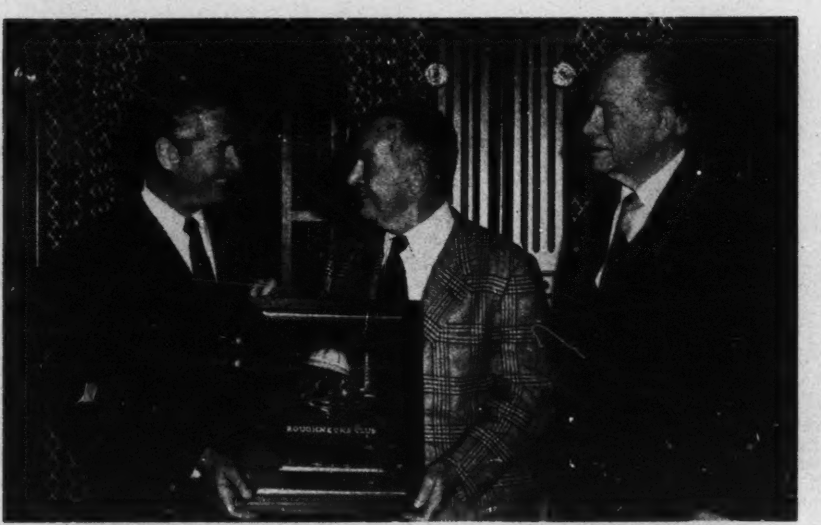
Unconventional sources are natural gas deposits trapped in tight sands, or in reservoirs within formations of low permeability, including shales and coal seams, as well as those trapped or dissolved in geopressured aquifers. Without these unconventional gas sources, however, F&S warns there will be less than 5 years of reserves in conventional gas reservoirs by the year 2000. If prices are to reach a level necessary to provide industry-acceptable 15% return, F&S says, gas must increase from about $2/Mcf (in 1980 dollars) to $3 to $3.75/Mcf.

At $3.50/Mcf, all unconventional sources, with the exception of geopressured aquifers, become economically producible. At that price level, about 26 tcf, or 8% of total economically recoverable gas resources, will be unconventional. Deregulation—the equivalent of a free market price for gas — must take place before 1985, however, if this equilibrium level pricing is to be reached, F&S says.

In brief, as the availability and profitability of natural gas continue to decline, arrested only by significant price increases, these unconventional sources become indispensable. Total estimated recoverable unconventional gas available from the four sources ranges between 87 and 1,156 tcf, broken down as follows:

Estimated recoverable unconventional gas, tcf	
Source	**Range**
Tight sands	70 to 560
Devonian shale	4 to 520
Geopressured aquifers	0.05 to 42
Coal-bed methane	13.5 to 34

If recovery technology improves, total reserves become significantly greater.



Texas Governor William P. Clements Jr. (center) receives a plaque naming him a member of the Roughnecks Club with the special title of Ambassador from James E. Chenault Jr. (left), president of Lone Star Steel Co. Looking on is L. D. Webster, a Lone Star Steel vice president, who planned the Roughnecks Club program 27 years ago and has directed it since.

Dual Completion Offshore Texas

MGF Oil Corp.'s Kilroy et al No. 1 High Island 87-S exploratory well, offshore Jefferson County, Texas, has been dually completed from two Miocene sands that occur within the interval of 7,400 to 8,200 ft. The well was drilled to a TD of 9,145 ft.

Through a perforated interval of 7,390 to 7,394 ft in the shallower sand, the well flowed at a daily rate of 492 bbl of 33.6° gravity oil with no water. Flowing tubing pressure was 845 psi through a $^{12}/_{64}$-in. choke.

The deeper sand, perforated between 8,152 and 8,198 ft, flowed at a rate of 1.2 MMcfd of gas, no water, with a flowing tubing pressure of 2,272 psi on a $^{10}/_{64}$-in. choke.

This well is located approximately 45 miles northeast of Galveston, Tex., in state-controlled waters of the Gulf of Mexico.

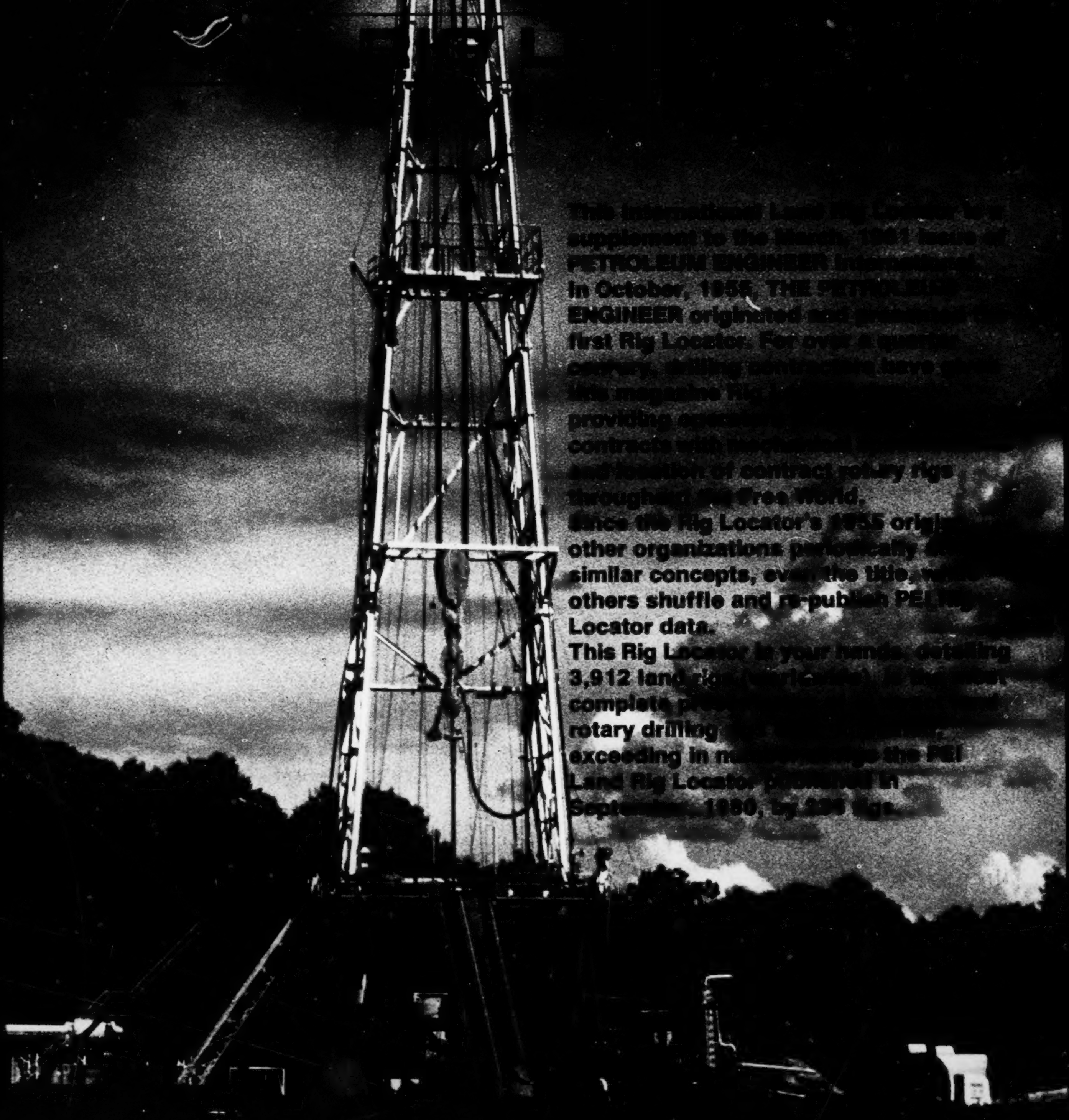
Texaco Tests Two Offshore Wells

Texaco U.S.A. has announced successful tests from two wells in Vermilion Block 380 in the Gulf of Mexico, approximately 130 miles southwest of Morgan City, La.

Texaco's A-3 well discovered a new reservoir in the Pleistocene formation at intervals between 7,881 and 7,950 ft. The well tested at a rate of more than 800 b/d of oil through a $^{7}/_{16}$-in. choke in what is predominantly a gas-prone area of the Gulf.

The well was drilled to a TD of 8,355 ft from a 10-well platform — the company's outermost offshore platform in the Gulf of Mexico — in 340 ft of water.

Petroleum Engineer INTERNATIONAL



This International Land Rig Locator is a supplement to the March, 1981 issue of PETROLEUM ENGINEER International.

In October, 1955, THE PETROLEUM ENGINEER originated and published the first Rig Locator. For over a quarter century, drilling contractors have used this magazine Rig [illegible] providing [illegible] contracts with [illegible] and location of contract rotary rigs throughout the Free World.

Since the Rig Locator's 1955 origin[illegible] other organizations periodically [illegible] similar concepts, even the title, while others shuffle and re-publish PEI Rig Locator data.

This Rig Locator in your hands, detailing 3,912 land rigs (worldwide), is the most complete pr[illegible] rotary drilling [illegible] exceeding in number [illegible] the PEI Land Rig Locator published in September, 1980, by 294 rigs.

BEST AVAILABLE COPY

Petroleum Engineer® INTERNATIONAL

Spring 1981 International

LAND RIG LOCATOR

Drilling for The Louisiana Land and Exploration Co., Eagle Production & Drilling Services Inc.'s Rig 2 is shown on location in Lawrence County, Mississippi.

TABLE OF CONTENTS

Abbreviations R-5
U.S. Rotary (Land) Drilling Contractors R-6
U.S. Contract Rotary (Land) Drilling Rigs R-9
Canadian Rotary (Land) Drilling Contractors R-42
Canadian Contract Rotary (Land) Drilling Rigs R-43
International Rotary (Land) Drilling Contractors R-47
International Contract Rotary (Land) Drilling Rigs R-47

RIG LOCATOR AD INDEX

AMF Tuboscope R-33 (314)
A-Z International R-10 (304)
Bestolife Corp. R-20 (307)
Challenger Rig R-28-29 (312)
Dreco R-2 (301)
Emtec R-14 (305)
M C M Enterprises R-15 (306)
NL Baroid R-23 (308)
Nelson International R-51 (316)
Reed Rock Bit R-56 (303)
Scientific Drilling R-25 (310)
Sedis R-24 (309)
TRG Drilling R-27 (311)
Torrington Co. R-35 (315)
Wilson Manufacturing R-31 (313)
Woolley Tool R-55 (302)

DRAWWORKS MANUFACTURERS ABBREVIATIONS

Bethlehem Supply Co.	Beth
Bucyrus-Erie Co.	B. Erie
Cabot Corporation Machinery Division.	Cabot/Franks
Cardwell Manufacturing Company Inc.	Crdwll
Challenger	Challenger
Continental-Emsco.	EMSCO
Fred E. Cooper.	Cooper
DeMag Manufacturing Co.	DeMag
Ewbanks Speedstar	Ewbanks
George E. Failing Co.	Failing
Foramines	FORAMINES
Gardner-Denver	Gar-Den
Gary Drilling.	Gary
Hacker Machine & Supply Co.	Hacker
Hooper Machine Works Inc.	Hooper
Howard-Turner Machine Works	Howard-Turner
Ideco Inc.	Ideco
Ingersoll-Rand Co.	Ingersoll
Joy Manufacturing Co.	Joy
Lee, Harold Engineering, The	Lee
Mayhew Supply Co. Inc.	Mayhew
Justiss Mears Oil Co.	JFJ
Mid-Continent Supply.	M-CSCO
National Supply	Natl
OIME	OIME
OILWELL Div. (U.S. Steel)	OILWELL
Pool Company	Pool
Salzgitter Maschinen Manufacturing Co.	Salzgitter
Skytop/Brewster	Brwstr
Spencer-Harris Machine & Tool Company.	Spencer
Sullivan	Sullivan
Superior (DRECO Ltd.).	Superior
Unit Rig Company	Unit
Wagner-Morehouse Inc.	Wgnr-Mrhss
Walker-Neer Manufacturing Company Inc.	Wlkr-Nr
The Wheland Company	Whlnd
Wichtex Machinery Co. Inc.	Wichtex
Wilson Manufacturing Co. Inc.	Wlsn

Petroleum Engineer INTERNATIONAL

U.S. Rotary (Land) Drilling Contractors

A

A & P DRLG CO INC 2601 NW Expressway Suite 709 Oklahoma City OK 73112 405-843-1557
ABERCROMBIE DRLG INC 801 Union Center Wichita KS 67202 316-262-1841
ACT DRLG CO P O Box 690 Yukon OK 73099 405-495-2903
ADECO DRLG & ENGR CO LTD 505-2nd Street SW Calgary Canada T2P 1N8 403-266-6291
AIKINS DRLG CO 151 10th Avenue N Shelby MT 59474 406-434-2565
ALANCO DRLG CO P O Box 1970 Alice TX 78332 512-664-2388
ALL WESTERN DRLG P O Box 414 Vernal UT 84078 801-789-4581
ALLEN DRLG CO P O Box 1389 Great Bend KS 67530 316-793-5681
ALLISON DRLG CO INC 1275 Sherman Street Denver CO 80203 303-861-2228
AMOY DRLG & WELL SERV CORP 101 Elizabeth Ann Blvd Lafayette LA 70508 318-237-9000
ANDERSON-MYERS DRLG CO 1515 Arapahoe Suite 1075 Denver CO 80202 303-623-5600
APACHIE DRLG INC Route 2 Lowell OH 45744 614-373-6384
APOLLO DRLG & EXPL INC Campbell Center Suite M-1070 Dallas TX 75206 214-361-8920
ARAPAHOE DRLG CO P O Box 26687 Albuquerque [illegible] 27125 504-247-2294
ARD DRLG CO P O Box 1030 Midland TX 79701 915-684-5716
ARDEN DRLG CO P O Box 968 Edmond OK 73034 405-348-1806
ARDMORE DRLG CO P O Box 308 Ardmore OK 73401 405-223-2292
ARMSTRONG DRLG INC P O Box 545 Wooster OH 44691 216-262-4101
ARTESIA FISHING TOOL CO P O Box 196 Artesia NM 88210 505-746-6651
ASPEN DRLG CO P O Box P Shelby MT 59474 406-434-5266
ASTRAFOR SAIC Tucuman 117 8 Piso Buenos Aires Argentina
ASTRO DRLG CO 6801 South Western Suite 201 Oklahoma City OK 73139 405-632-9729
ATCO DRLG INC 3515 South Tamarac Suite 230 Denver CO 80237 303-770-2490
ATCO DRLG INC-SOUTHERN DIV 9100 Southwest Frwy Suite 111 Houston TX 77074 713-777-9198
ATLANTIC OIL CO P O Box 497 Paramount CA 90723 213-633-5151
ATLANTIC PACIFIC MARINE CORP 458 Phosphor Avenue Metairie LA 70005 504-837-9272
AUSTIN DRLG CO P O Box 1240 Seminole OK 74868 405-382-2600
AUSTIN JIMMIE & SONS INC P O Box 1240 Seminole OK 74868 504-382-2600
AUSTIN-DUNHAM INC P O Box 1240 Seminole OK 74868 405-382-2600
AZTEC WELL SERV CO P O Box B Aztec NM 87401 505-334-6194

B

BBL DRLG CORP 510 North Big Spring Midland TX 79701 915-683-5653
B-J INC P O Box 461 Crossville TN 38555 615-484-8969
BAILEY PERNIE DRLG CO P O Box 70 Port Barre LA 70577 318-585-6462
BAKER & TAYLOR DRLG CO P O Box 2748 Amarillo TX 79105 806-373-8307
BANNER DRLG CO 210 West 27th Street Scottsbluff NE 69361 308-632-3311
BARNES CORE DRLG CO 1350 Roberts Lane Bakersfield CA 93308 805-399-9181
BARNHART DRLG CO INC P O Box 2976 Casper WY 82602 307-234-0894
BARR DRLG CORP P O Box 148 Salem IL 62881 628-548-0200
BARRETT DRLG CO P O Box 1345 Shawnee OK 74801 405-273-6217
BASIN DRLG CORP 2601 NW Expressway Oklahoma City OK 73112 405-840-2911
BASKI DRLG INC 6265 East Huerfano Road Pueblo CO 81006 303-948-3900
BAWDEN DRLG INC 4544 Post Oak Place Dr Houston TX 77027 713-629-1520
BAYLESS DRLG CO 216 South Hill Farmington NM 87401 505-327-3513
BDK DRLG CO INC P O Box 2488 Victoria TX 77901 512-573-9121
BEARD DRLG CO P O Box 263 Mt Carmel IL 62863 618-262-5194
BEARDEN JACK E DRLG CO 4726 Jacksboro Hwy Wichita Falls TX 76302 817-767-1474
BERENTZ DRLG CO P O Box 428 Eureka KS 67045 316-583-5202
BERGMAN DRLG INC 520 Union Center Bldg Wichita KS 67202 316-267-5291
BETA DRLG INC 117 West Loop South Suite 156 Houston TX 77027 713-840-0044
BF & B DRLG INC 2525 NW Expressway Oklahoma City OK 73112 405-848-2866
BIG 6 DRLG CO 7500 San Felipe Suite 666 Houston TX 77063 713-783-2300
BIG CHIEF DRLG CO P O Box 14837 Oklahoma City OK 73114 405-843-5721
BIG SEVEN DRLG CO 400 Wright Bldg Evansville IN 47708 813-425-3503
BIG SPRINGS DRLG INC P O Box 8287 Wichita KS 67508 316-681-1732
BIG-O-DRLG INC 2701 Paton Way Bakersfield CA 93308 805-589-2012
BIGARD JAMES DRLG CO 1315 N Mission Road Box 509 Mt Pleasant MI 48858 517-772-5955
BILBO DRLG CO P O Box 1099 Victoria TX 77901 512-578-6258
BILLINGS OIL SERV INC 2501 Suntide Road Corpus Christi TX 78410 512-241-2871
BLACKSTONE DRLG INC P O Box 1148 McPherson KS 67460 316-214-1250
BLOCKER DRLG CO 800 Bering Drive - Suite 400 Houston TX 77057 713-977-2030
BODARD-HALE DRLG CO P O Box 1565 Shawnee OK 74801 405-273-3322
BOMAC DRLG 10403 W Colfax Avenue Lakewood CO 80215 303-234-1444
BONRAY DRLG CORP Box 340 Route 4 Oklahoma City OK 73121 405-8484-6891
BRAHANEY DRLG CO INC P O Box 1694 Midland TX 79702 915-684-6305
BRANDT DRLG INC 1200 Douglas Building Wichita KS 67202 316-262-8357
BREA DRLG CO 12655 W Washington Blvd #106 Los Angeles CA 90066 213-390-8603
BREHM C E DRLG & PROD P O Drawer 648 Mt Vernon IL 62864 618-242-4620
BRINKERHOFF DRLG CO INC 555 17th Street Suite 3400 Denver CO 80202 303-571-1041
BRINKERHOFF-SIGNAL INC 3400 Anaconda Tower Denver CO 80202 303-571-1041
BROWN TOM INC P O Box 2608 Midland TX 79702 915-682-9715
BUFFALO DRLG CO INC 435 Page 220 W Douglas Wichita KS 67202 316-265-9686
BURNS L D DRLG CO One Parker Square Suite 401 Wichita Falls TX 76308 817-723-0512
BURRIS DRLG CO 555 17th Street Suite 2610 Denver CO 80202 303-892-9718
BURRO DRLG CO INC P O Box 4260 Victoria TX 77901 512-578-9021
BUTLER DRLG CO P O Box 14291 Houston TX 77002 713-734-1661
BUTLER-JOHNSON INC 600 Travis Place Shreveport LA 71101 318-226-0731
BUZZINI DRLG CO 8700 Crownhill Suite 402 San Antonio TX 78209 512-824-3293

C

C & H DRLG CO 2626 South Clack Abilene TX 79602 915-677-8529
C & R DRLG CO 410-17th Street Suite 1140 Denver CO 80202 303-623-6144
C & R DRLG CORP P O Box 857 Perry OK 73077 405-336-2403
CACTUS DRLG CO P O Box 2068 Hobbs NM 88240 505-393-2146
CACTUS DRLG CORP P O Drawer 2800 Midland TX 79702 915-563-2500
CALIFORNIA PROD SERV INC 19431 South Santa Fe Ave Compton CA 90224 213-639-7074
CALVERT WESTERN EXPL CO 902 Fort Worth Club Bldg Fort Worth TX 76102 817-335-1131
CAM DRLG INC P O Box 2755 Abilene TX 79604 915-672-2551
CAPE DRLG CO P O Box 756 Tyler TX 75710 214-593-8255
CARAWAY FRANK DRLG CO P O Box 982 San Angelo TX 76902 915-655-7968
CARDINAL DRLG CO P O Box 1077 Billings MT 59103 406-248-7324
CARMACK DRLG CO 592-25 Road Grand Junction CO 81501 303-245-2500

C (Contd)

CARTER DEV CORP 1516 Two Turtle Creek Village Dallas TX 75219 214-521-9580
CARTER LAND & CATTLE CO INC P O Box 814 Chanute KS 66720 316-431-2080
CASTER WELL DRLG INC Forest Avenue Ext Jamestown NY 14701 716-484-7436
CENTURY DRLG CO P O Box O Shelby MT 59474 406-634-5091
CHALLENGER DRLG 220-444 7th Avenue SW Calgary AB Canada T2P 0X8 403-269-3121
CHEROKEE DRLG & DEV CORP P O Box 2381 Midland TX 79702 915-563-1516
CHEROKEE DRLG & OPERATING INC Route 2 Box 44AA Lowell OH 45744 614-373-6384
CHESLEY PRUET DRLG CO P O Box 447 Laurel MS 39440 601-649-1200
CHICO DRLG CO 808 Commerce Bldg Fort Worth TX 76102 817-336-8688
CHILES DRLG CO 5100 Westheimer Suite 135 Houston TX 77056 713-621-4991
CINCO DRLG CO P O Box 2089 Alice TX 78332 512-664-9556
CIRCLE BAR DRLG CO 2-3-4 Loyola Bldg Suite 505 New Orleans LA 70112 504-581-5502
CLAWSON-BAULCH DRLG P O Box 516 Ada OK 74820 405-332-4181
CLEVELAND DRLG INC 305-4800 Stockdale Hwy Suite 30 Bakersfield CA 93309 805-327-5268
CLIFFS DRLG CO 2-Allen Center Suite 3150 Houston TX 77002 713-651-9426
COLEMAN DRLG CO P O Drawer 3337 Farmington NM 87401 505-325-6892
COMANCHE DRLG INC Route 2 Box 44AA Lowell OH 45744 614-373-6384
COMANCHE DRLG CO P O Box 636 Cut Bank MT 59427 406-873-5731
COMET DRLG CO Box 51529 Oil Cntr Sta Lafayette LA 70505 318-233-0414
COMPADRE OIL CORP P O Box 97 Ardmore OK 73401 405-223-3127
CORPUS CHRISTI DRLG CO 4605 Weiskopf Lane Corpus Christi TX 74813 512-852-7642
CRAWFORD DRLG 900 One Energy Square Dallas TX 75206 214-369-4424
CRC MALLARD INC P O Drawer 51498 OCS Lafayette LA 70505 318-233-4922
CRESCENT DRLG CO P O Box 626 Calhoun Road Owensboro KY 42301 502-926-4656
CULVER DRLG CO 3910 Cameron Street Lafayette LA 75006 318-269-0088
CYCLONE DRLG & WORKOVER INC Route 2 Box 31 Stroud OK 74079 918-968-3551
CYCLONE DRLG INC P O Box 246 Gilette WY 82716 307-682-4161

D

D & D DRLG CO P O Box 351 Ferriday LA 71334 318-757-3274
D-B DRLG CORP 600 First National Bank Bldg Abilene TX 79601 915-672-2841
DAKOTA DRLG INC P O Box 936 Pierre SD 57501 605-224-8393
DAMAC DRLG CO INC P O Box 1164 Great Bend KS 67530 316-792-1353
DAVIS D L DRLG CO INC P O Box 570 Mt Carmell IL 62863 618-262-7624
DELTA DRLG CO P O Box 2012 Tyler TX 75710 214-595-1911
DISCOVERY DRLG INC 3211 Southland Center Dallas TX 75201 214-742-6196
DIXILYN-FIELD DRLG CO P O Box 4251 Houston TX 77210 713-877-8850
DIXON DRLG CO P O Box 2320 512 First National Bank Abilene TX 79604 915-677-8503
DNB DRLG INC 515 RH Garvey Wichita KS 67202 316-264-8328
DOSS INC P O Box 542 Van Vleck TX 77482 713-245-1711
DREILING OIL INC Route 1 Victoria KS 67671 913-735-2204
DRILCON INC 8150 N Central Expwy Suite 1255 Dallas TX 75206 214-691-1924
DRILLERS INC 5629 FM 1960 Houston TX 77069 713-893-1020
DUAL DRLG CO P O Box 240 Wichita Falls TX 76307 817-723-2127
DUKE DRLG CO P O Box 823 Great Bend KS 67530 316-793-3366
DUNBAR DRLG INC 5252 North Broadway Wichita KS 67219 316-832-0501
DUNNE-GARDNER PETROLEUM INC 200 W Douglas Suite 250 Wichita KS 67202 316-265-1611

E

E & H DRLG CO P O Box 1058 Graham TX 76046 817-549-0370
E JAY DRLG CORP 8955 Katy Frwy Houston TX 77024 713-932-6771
EAGLE DRLG CO 114 Jefferson Davis Blvd Natchez MS 39120 601-445-8863
EAGLE DRLG INC P O Box 8609 Wichita KS 67208 316-682-5513
EAGLE PRODUCTION & DRLG SERV INC 3626 North Hall Suite 500 Dallas TX 75219 214-521-0021
EARL & SONS DRLG INC Box 111 Cedar Crest Albuquerque NM 87122 505-281-3880
EARNEST INC P O Box 1216 Okmulgee OK 74447 918-756-2616
EASON T T CO/EASON OIL CO 2601 NW Expressway Oklahoma City OK 73112 405-848-8711
ECONOMY DRLG INC P O Box 35 Converse TX 78109 512-659-1977
EDCO DRLG CO P O Box 645 El Dorado KS 67042 316-321-9285
EDWARDS WELL SERV 7001 Fruitvale Extension Bakersfield CA 93308
ELENBURG EXPL INC P O Box 1850 Havre MT 59501 406-265-5811
ENERGY DRLG CO INC P O Box 905 Natchez MS 39120
ENOPCO 12700 Park Central Pl Suite 1204 Dallas TX 75251 214-387-8503
EQUITY DRLG CO 3850 E Frank Phillips Blvd Bartlesville OK 74003 918-333-4620
EXCELL DRLG CO P O Box Wray CO 80758 303-332-4028
EXETER DRLG NORTHERN INC P O Box 17349 Denver CO 80217
EXETER DRLG SOUTHERN INC 1010 Common St 2635 Bank Bldg New Orleans LA 70112 505-581-1498

F

F-W DRLG CO 333 Bank of Commerce Bldg Abilene TX 79605 915-695-2064
FAIRMAN DRLG CO P O Box 288 Dubois PA 15801 814-371-8410
FAITH DRLG CO P O Box 7 Houston TX 77001 713-524-7111
FALCON DRLG CO 1700 S E 22 Second Oklahoma City OK 73129 405-670-3161
FARMER JOHN O INC P O Box 352 Russell KS 67665 913-483-3144
FARNSWORTH & KAISER DRLG CO 13 South Seneca Newcastle WY 82701 307-746-2591
FAULK DRLG CO P O Box 429 Breckenridge TX 76024 817-559-3744
FELDERHOFF BROS DRLG CO P O Drawer 400 Muenster TX 76252 817-665-3592
FINLEY OIL WELL SERV INC P O Box 7296 Long Beach CA 90807 213-427-7265
FISCUS DRLG CO INC Route 1 Box 572-A Big Spring TX 79720 915-393-5211
FLOURNOY DRLG CO P O Box 491 Alice TX 78332 512-668-8364
FORWEST INC 11211 Katy Freeway Suite 255 Houston TX 77079 713-932-7976
FOUR CORNERS DRLG CO P O Box 1067 Framington NM 87401 505-327-0322
FRANCE DRLG CO 700 Travis Place Shreveport LA 71101 318-221-3434
FRANKLIN DRLG CO P O Box 336 Graham TX 76046 817-549-5661
FREEMAN DRLG CO INC 251 North Water Suite 10 Wichita KS 67202 316-263-7049
FRIO DRLG & PROD CO 1216 Guaranty Bank Plaza Corpus Christi TX 78475 512-883-8555
FWA DRLG CO INC P O Box 419 Wichita Falls TX 76307 817-322-0761

G

G-C DRLG CO INC 104 South Broadway Suite 1107 Wichita KS 67202 316-263-1793
G-E DRLG INC P O Box 3155 Victoria TX 77901 512-578-5245
GABBERT-JONES INC 830 Sutton Place Wichita KS 67202 316-263-6209
GALLAGHER DRLG INC P O Box 3046 Evansville IN 47702 812-425-8256

U.S. Rotary (Land) Drilling Contractors

G (Contd)

GARY DRLG CO 7001 Fuitvale Extension Bakersfield CA 93308 805-589-0111
GAY DRLG CONTRACTORS P O Box 457 Duncan OK 73533 405-255-2528
GCO DRLG CO P O Box 3134 Abilene TX 79604 915-673-4731
GENERAL WELL SERV INC P O Box 308 Cut Bank MT 59427 406-873-2331
GIBSON DRLG CO P O Box 1540 Kilgore TX 75662 214-984-5068
GIBSON J W WELL SERV INC 3025 S Parker Rd Suite 711 Aurora CO 80014 303-752-2527
GLASSCOCK DRLG INC P O Box 51716 OCS Lafayette LA 70505 318-232-8620
GLOBE DRLG CO INC 310 Fair Foundation Bldg Tyler TX 75702 214-593-0281
GOLDEN STATE DRLG INC 3312 Fruitvale Avenue Bakersfield CA 93303 805-589-0730
GOLDRUS DRLG CO 900 First City Natl Bank Houston TX 77002 713-658-9271
GOPHER DRLG CO P O Box 949 Thicket TX 77374 713-298-2511
GRAVES DRLG CO INC 910 Union Center Wichita KS 67202 318-233-4400
GREAT SOUTHERN OIL & GAS CO P O Box 52707 Lafayette LA 70505 318-233-4400
GREEN DRLG CO P O Box 667 Gillette WY 82716 307-686-1381
GREY WOLF DRLG CO 2000 S Post Oak Rd Suite 1730 Houston TX 77056 713-626-1373
GUFFEY-SCHLENSKER DRLG CORP P O Box 1330 Richardson TX 75080 214-231-8551
GWALTNEY DRLG CO INC P O Box 520 Washington IN 47501 812-254-5085

H

H & S DRLG CO 320 So Boston Suite 2000 Tulsa OK 74103 918-587-8163
H-30 DRLG INC 251 North Water Wichita KS 67202 316-263-2043
HACK DRLG CO P O Box 5108 Abilene TX 79605 915-692-4111
HARKINS & CO P O Box 1490 Alice TX 78332 512-883-3022
HARPEL DRLG CO P O Box 2811 Casper WY 82602 307-265-9193
HARPER-TURNER DRLG 904 Hightower Bldg Oklahoma City OK 73102 403-232-3244
HARRIS DRLG CO Box 99 Hwy 15 Grayville IL 62844 618-375-2211
HARRIS WELL SERV INC P O Drawer 949 Eunice LA 70535 318-457-3376
HATCHER H F & SON P O Box 167 Smackover AR 71762 501-725-3034
HELMERICH & PAYNE INTL DRLG Utica at Twenty-First Tulsa OK 74114 918-742-5531
HERB EXPL P O Box 1934 Abilene TX 79604 915-672-1291
HICKMAN DRLG CO P O Box 1467 Woodward OK 73801 405-256-8688
HILLIN DRLG CO P O Box 152 Odessa TX 79760 915-563-3560
HINTON W B DRLG CO INC P O Box 1237 Mt Pleasant TX 72455 214-572-8777
HOLLIDAY DRLG INC P O Box 3489 Midland TX 79701 915-697-2208
HONDO DRLG CO P O Drawer 2516 Midland TX 79702 915-682-9401
HONEYMON DRLG CO LTD P O Box 74506 Oklahoma City OK 73147 405-947-2319
HOWELL DRLG INC 635 Milam Bldg San Antonio TX 78205 512-227-5283
HUDSON LEONARD DRLG CO INC P O Box 1876 Pampa TX 79065 806-665-1816
HUGHES DRLG CO INC Route 4 Box 38-A Enid OK 73701 405-234-7222
HUNNICUT & CAMP DRLG CO P O Box 399 Rio Vista CA 94571 707-374-2425
HUSKY DRLG CO INC 200 E First Suite 500 Wichita KS 67202 316-263-7904
HYLTON DRLG CO 7512 Kimberly Ave Bakersfield CA 93308 713-659-4816

I

I X DRLG CO INC P O Drawer 835 South Dale St Stephenville TX 76401 817-965-7818
INLAND WELL SERV INC P O Box 488 Abbeville LA 318-893-3486
INTL PETROLEUM SERV CO P O Box 547 Sheffield PA 16347 814-968-3295
IRONWOOD DRLG INC 1021 ESE Loop 323 Suite 350 Tyler TX 75703 214-561-5026

J

J & C DRLG CO P O Box 216 Refugio TX 78377 512-526-2376
J & W DRLG CO 1717 9th St Wichita Falls TX 76301 817-767-5447
J B RODEN DRLG CO P O Box 880 Mills WY 82644 307-266-6552
J-V DRLG CO INC 4445 Commerce St Evansville IN 47710 812-424-3571
JERNIGAN DRLG CO 10220 West Reno Oklahoma City OK 73147 405-324-5000
JOHNN DRLG CO P O Box 6157 Odessa TX 79762 915-563-1280
JOHNSON BATES DRLG CO INC P O Box 128 Konawa OK 74849 405-925-3256
JONES DRLG CO P O Box 1058 Albany TX 76430 915-762-3652
JONES DRLG CORP P O Box 1185 Duncan OK 73533 405-255-3532
JUSTISS MEARS OIL CO INC P O Drawer N Jena LA 71342 318-992-4111

K

K B DRLG CO P O Box 1848 Harve MT 59501 406-265-9832
KAN-GO INC P O Box 254 Marion KS 66861 316-382-2665
KAY DRLG CO P O Box 1622 Ponca City OK 74601 405-765-2407
KAY EXPL CO P O Box 2265 Ponca City OK 74601 405-765-2407
KELLOGG K L & SONS P O Box 7053 Long Beach CA 90807 213-422-1247
KENAI DRLG LTD 477 Madison Ave New York NY 10022 212-688-6600
KENAI DRLG OF TEXAS INC P O Box 6725 Odessa TX 79762 915-362-2323
KENAI DRLG WEST COAST INC P O Box 2248 Orcutt CA 93454 805-928-1701
KENDALL DRLG CO INC P O Box 5304 Evansville IN 47715 812-477-5535
KERN DRLG CO INC P O Box 688 Magnolia AR 71753 501-234-5011
KINGERY DRLG CO INC P O Box 1588 Ardmore OK 73401 405-223-6823
KISSINGER PETROLEUM CORP P O Box 22004 Denver CO 80222 303-773-0550

L

L & G DRLG CO P O Box 35 Mt Pleasant MI 48858 517-772-3083
L & K DRLG CO 730 West Britton Rd Oklahoma City OK 73114 405-848-8653
L D DRLG CO P O Box 324 Great Bend KS 67530 316-793-3051
LLL DRLG CO INC P O Box 188 Blomfield NM 87413 505-632-8045
L & M DRLG INC P O Box 647 Artesia NM 88210 505-748-2205
L & R DRLG CO P O Box 936 Pierre SD 57501 605-224-2467
LAGERSEN DRLG CO INC 302 Beck Bldg Shreveport LA 71101 318-227-9939
LAMA DRLG CO INC P O Box 430 Natchez MS 39120 601-445-5568
LANDFORD DRLG CO INC P O Box 98 Shreveport LA 71161 318-869-2519
LANDIS DRLG CO P O Box 3579 Midland TX 79702 915-683-4151
LARCO DRLG CO INC 1700 Capital Tower Jackson MS 39211 601-355-1542
LAUCK D R OIL CO INC 221 South Broadway Suite 400 Wichita KS 67202 316-363-[illegible]267
LAYTON OIL CO P O Box 263 Independence KS 67301 316-331-1150
LESTER DAN DRLG CO INC P O Drawer N Jefferson TX 75657 214-665-2511
LIN-MOUR DRLG CORP 1411 13th St Bldg 1 Wichita Falls TX 76301 817-322-8550

L (Contd)

LOFFLAND BROS CO P O Box 2847 Tulsa OK 74101 918-622-9330
LOGAN DRLG CO INC P O Box 1622 Enid OK 73701 405-233-5048
LOHMANN JOHNSON DRLG CO INC 111 Main Street Evansville IN 47708 812-424-8291
LORD DRLG CO INC 14618 West 6th Avenue Golden CO 80401 303-279-2471
LOUISE DRLG CO INC P O Box 272 Louise TX 77455 713-648-2641
LOWE DRLG CO P O Box 1368 Albany TX 76430 915-762-2530
LUKE GRACE CO INC 710 Petroleum Bldg Wichita Falls TX 76301 817-723-2187

M

MGF DRLG CO P O Box 51628 OCS Lafayette LA 70505 318-232-1172
MGF DRLG CO-MIDLAND P O Box 5766 Midland TX 79701 915-684-7173
MND DRLG CORP P O Box 248 Bridgeport TX 76026 817-683-5106
MAGIC CIRCLE DRLG CORP 3001 United Founders Blvd Oklahoma City OK 73112 405-843-5388
MALLARD WELL SERV INC P O Drawer 51498 OCS Lafayette LA 70505 318-233-4922
MANNING R L CO 1700 Broadway Suite 2200 Denver CO 80290 303-839-1977
MAR-TAY DRLG CO P O Box 1216 Drumright OK 74030 918-352-3802
MARION DRLG CO INC P O Box 16006 Mobile AL 36616 205-626-3300
MARLIN DRLG CO INC P O Box 51887 OCS Lafayette LA 70505 318-232-6361
MARLIN WEST P O Box 551 Bakersfield CA 93302 805-327-8304
MATAGORDA DRLG CO P O Box 10307 Corpus Christi TX 78410 512-888-4213
MAXWELL HERRING DRLG CO P O Box 1297 Tyler TX 75710 214-593-1737
MAYRONNE CO P O Box Harvey LA 70059 504-368-5911
MAZ KAR OIL CO 126 W Broadway Centralia IL 62801 618-532-9327
MCDONALD & SON DRLG CO SSRB Box 68 Marble Falls TX 78654 512-598-5731
MCCONNELL DRLG CO 111 Frio Street Lockhart TX 78644 512-398-2627
MCCUTCHEN J W DRLG CO 410 Oil & Gas Bldg Wichita Falls TX 76301 817-322-9231
MCLENNAN DRLG CO P O Box 6 Nowata OK 74048 918-273-1265
MCVAY DRLG CO 308 Philtower Bldg Tulsa OK 74103 918-584-5472
MEGARGEL DRLG CO INC P O Box 356 Megargel TX 76370 817-563-2311
MELTON DRLG CO 7101 Downing Ave Bakersfield CA 93308 805-587-0521
MERCURY DRLG CO 1701 South East 25th Street Oklahoma City OK 73129 405-672-4441
MERIT DRLG CO P O Box 79667 Houston TX 77079 713-789-4014
MESA DRILLERS P O Box 108 Lubbock TX 79408 806-744-1017
MESA DRLG CO INC 241 Pine One Energy Square Suite 7A Abilene TX 79601 915-673-4787
MGF DRLG CO 2626 Richmond Ave Suite B Houston TX 77098 713-526-7336
MICHIGAN CONSOLIDATED GAS CO P O Box 1118 Big Rapids MI 49307 616-796-7909
MIDCO DRLG INC 200 E First Suite 520 Wichita KS 67202 316-265-1808
MIDWEST DRLG LTD 1026 Cookson Ave New Philadelphia OH 44663 216-339-5515
MILLER CONTRACT DRLG INC P O Box 478 Livingston TN 38570 615-823-6425
MITCHELL GEORGE N DRLG CO P O Box 254 Carmi IL 62821 618-382-9343
MOLEN DRLG CO INC P O Box 869 Billings MT 59101 406-252-2391
MONTGOMERY DRLG CO P O Box 2508 Bakersfield CA 93303 403-232-1644
MORAN BROS INC 1000 Petroleum Bldg Wichita Falls TX 76301 817-723-1432
MORAN E W DRLG CO INC 1200 Oil & Gas Bldg Wichita Falls TX 76301 817-322-7891
MORANCO P O Box 1860 Hobbs NM 88240 505-393-7176
MORRISON DRLG & PRODUCING CO One Energy Square Suite 8-B Abilene TX 79601 915-677-8523
MORROW DRLG CO P O Box 4936 Odessa TX 79760 915-333-2875
MOSLEY WELL SERV INC P O Box 970 Minden LA 71055 318-377-2393
MURCO DRLG CO 1908 Beck Bldg Shreveport LA 71101 318-221-7373
MURFIN DRLG CO 617 Union Center Bldg Wichita KS 67202 316-267-3241
MURLYNSON DRLG CO P O Box 185 Alice TX 78332 512-664-3804
MUSTANG DRLG CORP 869 Fair Foundation Bldg Tyler TX 75702 214-597-9381
MUTUAL OF AMERICA INC P O Drawer 1446 Santa Fe NM 87501 505-982-5501

N

N & C DRLG CORP Route 3 Box 3361 Boerne TX 78006 512-755-8333
N E C K DRLG CO Bin X Taft CA 93268 805-769-8811
NABORS ALASKA DRLG INC 324 Eighth Ave SW TD Square Calgary Canada T2P 272 403-263-6610
NELSON DRLG & WELL SERV 1325 American Tower Shreveport LA 71101 318-221-6890
NEW & HUGHES DRLG CO INC P O Drawer 1487 Natchez MS 39120 601-442-1607
NICKLOS DRLG CO P O Box 752 Eunice LA 70535 713-658-8245
NICOR DRLG CO 500 Reunion Center 9 East 4th Tulsa OK 74103 918-587-5507
NIXON DRLG CO INC P O Box 632 Luling TX 78648 512-875-2416
NOBLE DRLG CORP 1924 So Utica Suite 600 Tulsa OK 74104 918-749-9901
NORMAN DRLG CO Route 8 Box 305 Clarksville TN 37040 615-645-4361
NORTHWEST DRLG CO Route 4 Box 38-A Enid OK 73701 405-234-6771
NORTON DRLG CO 606 Lubbock Natl Bank Bldg Lubbock TX 79401 806-747-3324
NORWOOD A N INC P O Box 310 Midland TX 79702 915-683-3972
NRG DRLG CO P O Box 1432 Owensboro KY 42301 502-685-8118

O

O'CONNOR & YOUNG DRLG CO 1980 So Post Oak Rd Suite 2380 Houston TX 77056 713-961-1107
OILWELL DRLG INC Highway 16 So P O Box 988 Graham TX 76046 817-549-6960
OLIVER E L DRLG CO P O Box 25103 Oklahoma City OK 73125 405-677-2461
ONEAL DRLG CO P O Box 20667 Oklahoma City OK 73120 405-751-3939
OWEN DRLG CO P O Box 861 Magnolia AR 71753 501-234-6300
OWENS JACK SERV CO INC 1626 Del Dayo Drive Camichael CA 90608 916-485-8995

P

PHD DRLG CO 1212 Main Suite 558 Houston TX 77002 713-658-8406
PADRE DRLG CO INC 2501 Suntide Road Corpus Christi TX 78410 512-241-2891
PAR-CO DRLG INC P O Box 873 Natchez MS 39120 601-442-6421
PARAMOUNT DRLG CO INC P O Box 1735 Shreveport LA 71166 318-227-8313
PARKER DRLG CO 8 E Third Street Tulsa OK 74103 918-585-8221
PEARL EXPL INC P O Box 2179 Alice TX 78332 512-664-5772
PEASE BROS INC 120 E Main Vernal UT 84078 801-789-1101
PENROD DRLG CO 3333 First Natl Bank Bldg Dallas TX 75202 214-651-0187
PEP DRLG CO P O Box 824 Mt Vernon IL 62864 618-242-2205
PETE MURPHY DRLG CO P O Box 185 Alice TX 78332 512-664-4540
PETER BAWDEN DRLG INC Garden Grove CA 92645 714-898-0491
PICKRELL DRLG CO 110 N Market Suite 205 Wichita KS 67202 316-262-8427

U.S. Rotary (Land) Drilling Contractors

P (Contd)

PILGRIM DRLG CO P O Box 788 Ardmore OK 73401 405-223-6070
POOL CO 2077 South Gessner Road Houston TX 77063 713-780-4999
PORTER GENE DRLG CO INC P O Box 389 Cushing OK 74023 918-225-1561
POWER RIG DRLG CO INC P O Box 52808 OCS Station Lafayette LA 70505 318-234-4526
PRAIRIE DRLG CO 5710 W Yellowstone Casper WY 82601 307-234-7191
PRC DRLG CO P O Box 1121 Corpus Christi TX 78403 512-884-8763
PRECISION EXPL CO INC P O Box 278 Olney IL 62450 618-395-3096
PROGRESS DRLG & MARINE INC 6001 Savoy Suite 400 Houston TX 77036 713-780-9400
PROJECT 5 DRLG CO INC 2212 Briggs Street Norman OK 73069 405-360-4810
PROVINS T D DRLG CO INC 2111 Enterprise Dr Mt Pleasant MI 48858 517-773-6946
PRUET-RAM CO P O Box 324 Laurel MS 39440 501-863-3612
PULLIAM DRLG CO P O Box 1104 Woodward OK 73801 405-256-4000
PYRAMID OIL WELL SERV P O Box 3225 Santa Fe Springs CA 90670 213-944-6703

Q

QUINTEX DRLG CO INC 1647 E 3rd Street Tulsa OK 74120 918-589-7623

R

RBI DRLG CO LTD 1200 Milam Street Suite 3200 Houston TX 77027
RWIT DRLG CO P O Box 551 Holdenville OK 74848 713-496-5000
RAINBOW DRLG CO INC P O Box 1779 Kilgore TX 75662 214-984-8516
RAINS & WILLIAMSON OIL CO INC 222 W Douglas Suite 435 Wichita KS 67202 316-265-9686
RANGE DRLG CO INC 240 Page Ct 220 W Douglas Wichita KS 67202 316-265-6231
RAPAD DRLG CO P O Box 324 Laurel MS 39440 501-863-3612
RATLIFF DRLG CO INC P O Box 988 Duncan OK 73533 405-255-2916
RAY RESOURCES 630 Commerce Square Charleston WA 25301 304-344-8383
REBEL DRLG CO P O Box 1151 Natches MS 39120 601-446-7831
RED TIGER DRLG CO 1720 Kansas State Bank Bldg Wichita KS 76202 316-263-2371
REMCO DRLG CORP 4131 Meadow Land Bossier City LA 71111 318-742-9595
REPUBLIC DRLG & SERV INC P O Box 27406 Houston TX 77056 713-877-8777
REPUBLIC DRLG CO 11823 E Slawson Ave Santa Fe Springs CA 90670 213-945-3661
REPUBLIC MINERALS CORP P O Box 27406 Houston TX 77027 713-621-8260
RESOURCE DRLG INC 1908 South Post Oak Houston TX 77056 713-871-8550
RHODES & HICKS DRLG CO P O Drawer 1579 Alice TX 78332 512-664-3467
RICHARDS OPERATING CO P O Box 1149 Bay City TX 77414 713-245-8389
RICHARDS-ARMSTRONG INC P O Box 1149 Bay City TX 77414 713-245-8389
RILEY DRLG CO 907 Scurry Big Spring TX 79720 915-267-5635
RINE DRLG CO INC 300 W Douglas Suite 600 Wichita KS 67202 316-267-1333
ROBINSON BROS DRLG CO P O Box 1027 Woodward OK 73801 405-254-3361
ROBINSON DRLG OF TEXAS INC P O Box 311 Big Spring TX 79720 915-267-5297
ROCKHOLD ENGR INC P O Box 698 Great Bend KS 67530 316-729-2506
ROD RIC CORP P O Box 1767 Midland TX 79702 915-682-7880
ROSAMOND DRLG CO INC P O Box 7656 W Monroe LA 71203 318-323-7736
ROTARY DRLG INC 117 East Elm Tyler TX 75702 214-592-8174
ROWAN DRLG - US 5051 Westheimer Houston TX 77056 713-621-7800
ROYOCO DRLG CO P O Box 681 Owensboro KY 42301 502-685-3687

S

SABRE DRLG CO P O Box 1150 Cushing OK 74023 918-225-3502
SAFARI DRLG CORP P O Box 3236 Abilene TX 79604 915-677-2960
SAGE DRLG CO INC 222 Sutton Place Wichita KS 67202 316-263-6139
SAN JACINTO DRLG CO 2014 Persa Street Houston TX 77019 713-227-5353
SANDERS WORKOVER & DRLG CO INC P O Box 1086 New Iberia LA 70560 318-364-1537
SANTA FE DRLG CO (WESTERN) 5400 Andrews Hwy Box 992 Odessa TX 79760 915-367-4181
SANTA FE DRLG CO P O Box 1401 Orange CA 92668 714-558-1300
SAWYER DRLG & SERV INC P O Box 1533 Shreveport LA 71105 318-227-8150
SCANDINAVIAN MONTGOMERY DRLG P O Box 2508 Bakersfield CA 93303 805-327-5736
SCHLENSKER DRLG CORP P O Box 1330 Richardson TX 75080 214-231-8551
SCOTT DON DRLG CO INC P O Box 177 Joesville MI 49250 517-849-9237
SCOTT JERRY DRLG CO INC P O Box 1488 Seminole OK 74868 405-382-2202
SEARCH DRLG CO Wellington SG Office Park Amarillo TX 79109 806-359-7645
SERVICE DRLG CO P O Box 5320 Borger TX 79007 806-273-7573
SH & J DRLG CORP P O Drawer 888 Magnolia AR 71753 501-234-4600
SHARP DRLG CO INC P O Box 1271 Midland TX 79702 915-683-3384
SHAWNEE DRLG CO INC Route 2 Box 44AA Lowell OH 45744 614-373-6384
SHIELDS DRLG CO P O Box 709 Russell KS 67665 913-483-3141
SHILLELAGH CORP P O Box 85 Wichita Falls TX 76307 817-322-7221
SHULER DRLG CO INC 3514 W Hillsboro El Dorado AR 71730 501-863-7234
SIMMONS DRLG INC P O Box 438 Cut Bank MT 59427 406-873-5626
SITTON DRLG CO 503 Lubbock National Bank Bldg Lubbock TX 79401 806-763-4443
SLAWSON DRLG CO INC 200 Douglas Bldg Wichita KS 67202 316-263-3201
SLEDGE GENE DRLG CORP First National Bank Suite 2301 Midland TX 79701 915-683-5261
SLOAN DRLG CO 2825 East Skelly Dr Suite 827 Tulsa OK 74105 918-749-0533
SMART DRLG CO Nine E 4th Street 700 Tulsa OK 74103 918-584-5596
SMITH DRLG CO INC P O Box 150 Lawrenceville IL 62439 618-943-2341
SNYDER DRLG WELL SERV CO P O Box E Hwy 1 South Grayville IL 62844 618-375-2491
SOAPE DRLG CO P O Box 1284 Billings MT 59103 406-252-1341
SOJOURNER DRLG CORP P O Box 3234 Abilene TX 79604 915-672-2832
SOUTH TEXAS DRLG CO 2005 Alamo National Bldg San Antonio TX 78205 512-224-5557
SOUTHLAND DRLG CO INC 9235 Katy Frwy Suite 222 Houston TX 77024 713-461-1995
STAHLCO DRLG CO P O Box 2231 Amarillo TX 79105 806-376-5038
STAR DRLG 2700 Anaconda Tower Denver CO 80202 303-571-4800
STERLING DRLG CO P O Drawer 3068 Midland TX 79702 915-685-3054
STERLING DRLG CO P O Box 129 Sterling KS 67579 316-278-2131
STOEPPELWERTH DRLG INC 2005 Norris Ave McCook NE 69001 308-345-1766
STONE M L DRLG CO P O Box 299 Saratoga TX 77585 713-298-2511
STRATA DRLG INC P O Box 355 Great Bend KS 67530 316-793-7971
SUMPTER & BARKER DRLG CO INC P O Box 1081 Stillwater OK 74074 405-372-4063
SUNDOWN DRLG CO P O Drawer AP Eagle Pass TX 75852 512-773-1173
SWEETMAN DRLG INC 410 One Main Place Wichita KS 67202 316-265-5561

S (Contd)

SWEETWATER DRLG CO INC P O Box 1649 Sweetwater TX 79556 915-235-1781
SYNTEX DRLG CORP One Energy Square Suite 10-LB Abilene TX 79605 915-677-8515

T

TRG DRLG CORP P O Box 20020 Oklahoma City OK 73056 405-755-5002
TWT EXPLORATION INC P O Box 1329 Park City UT 84060 801-649-8212
T & T DRLG CO INC P O Box 4607 Victoria TX 77901 512-578-5228
T-L DRLG CO INC 414 West Phillips Conroe TX 77301 713-756-7726
TAHOE DRLG CO 206 North Main Midland TX 79701 915-682-5325
TASCO DRLG CO P O Box 1075 Ardmore OK 73401 405-226-2054
TAYLOR DRLG CO P O Box 597 Chehalis WA 98532 206-748-3445
TESORO DRLG CO P O Box 2784 Laurel MS 39440 601-425-4312
TEXAS DRLG CO Abilene National Bank Bldg Suite 40 Abilene TX 79603 915-672-7803
TEXLAND DRLG CORP 600 First National Bank Bldg Abilene TX 79601 915-672-2841
THOMAS DRLG CO P O Box 400 Duncan OK 73533 405-255-0250
THOMPSON DRLG CO 4 - Corporate Drive Suite 102 Newport Beach CA 92663 714-644-9292
THUNDERBOLT DRLG INC P O Box 129 Winnsboro TX 75494 214-342-5221
TIERRA DRLG CORP P O Box 3339 Abilene TX 79603 915-677-7291
TOLTEK DRLG CO 340 Denver Club Bldg Denver CO 80202 303-255-5255
TOP DRLG CO INC 2601 Oil Center Bldg Oklahoma City OK 73112 405-521-9737
TORREON DRLG CO INC 805 The 600 Bldg Corpus Christi TX 78473 512-882-1953
TR DRLG CO INC P O Box 4882 Monroe LA 71203 318-388-4191
TRANSCONTINENTAL DRLG CO INC 555 17th Street Suite 2700 Denver CO 80202 303-571-4800
TRANSCONTINENTAL DRLG CO INC 2nd Floor Petroleum Bldg San Angelo TX 76903 915-653-3324
TRANSCONTINENTAL DRLG CO INC 1800 Beck Bldg Shreveport LA 71101 318-226-9577
TRANSWORLD DRLG CO LTD P O Box 25861 Oklahoma City OK 73102 405-270-1313
TREND DRLG CO P O Box 3310 Enid OK 73701 405-233-7838
TRI SERVICE DRLG CO P O Drawer 70 Midland TX 79702 403-453-3771
TRI-J DRLG CO P O Box 5338 Abilene TX 79605 915-684-6641
TRI-LAND DRLG CO P O Box 18605 Oklahoma City OK 73154 405-528-1463
TRIAD DRLG CORP 1100 Bitting Bldg Wichita KS 67202 316-263-0232
TRIANGLE DRLG CO 901 South Denver El Dorado KS 67042 316-321-3126
TRIGG DRLG CO INC P O Box 18605 Oklahoma City OK 73118 405-528-4456
TRUE DRLG CO P O Drawer 2360 Casper WY 82602 307-237-9301
TUCKER DRLG CO INC P O Box 1876 San Angelo TX 76901 915-655-6773
TURNER-WINTER DRLG & EXPL CO Route 1 Box 11-A Nowata OK 74048 918-273-1874
TWO R DRLG CORP P O Box 1968 Houma LA 70361 504-876-6987

U

URC DRLG CORP 2601 NW Expy Oil Center E #700 Oklahoma City OK 73112 405-840-2761
UNDERWOOD OIL WELL SERV INC 731 Lakeshore Drive Monroe LA 71203 318-343-2665
UNION DRLG INC P O Drawer 40 Buckhannon WV 26201 304-472-4610
UNIT DRLG & EXPL CO 1101 Petroleum Club Bldg Tulsa OK 74136 918-582-3188
UNITED DRLG CO OF TYLER Route 1 Box 924-Hwy 155N Tyler TX 75708 214-877-3411
UNIVERSAL DRLG CO 14 Sky Ranch Road Aurora CO 80011 303-341-4921

V

VECO DRLG INC P O Box 1705 Grand Junction CO 81501 303-242-6912
VENTURE DRLG CO P O Box 1353 Cushing OK 74023 918-225-3260
VERNA DRLG CO P O Box 952 Odessa TX 79760 915-381-0910
VI-ROI DRLG CO P O Box 1624 Duncan OK 73533 405-255-4566
VIERSEN & COCHRAN DRLG CO P O Box 19227 Oklahoma City OK 73144 405-681-6611

W

WEK DRLG CO INC P O Box 1498 Roswell NM 88201 505-623-5070
WES CORP 5710 W Yellowstone Casper WY 82601 307-234-0669
WAKEFIELD EARL F INC 300 W Douglas Suite 500 Wichita KS 67202 316-264-2366
WARREN INTERSTATE DRLG CO 906 Utica Tower Tulsa OK 74104
WARRIOR DRLG CO 5015 N Pennsylvania Oklahoma City OK 73112 405-840-1783
WARRIOR DRLG INC 905 Century Plaza Wichita KS 67202 316-262-3791
WARRIOR DRLG & ENGR CO INC 4200 Crabbe Rd Hwy 69 North Northport AL 35476 205-339-9700
WARTON DRLG CO P O Box 3747 Odessa TX 79760 915-362-0251
WEAL DRLG CO INC P O Box 140 Carmi IL 62821 618-382-7713
WELSH DRLG & SERV INC P O Box 45858 Houston TX 77045 713-433-4551
WES MOR DRLG INC P O Box 1169 Graham TX 76046 817-549-3383
WES-TEX DRLG CO P O Box 2895 Abilene TX 79604 915-677-9121
WESTBURNE DRLG INC 424 Republic Bldg 1612 Tremon Denver CO 80202 303-572-3055
WESTERN WELL DRLG INC 11299 Brighton Road Henderson CO 80640 303-288-2247
WHELESS DRLG CO 920 Commercial National Bank Bldg Shreveport LA 71101 318-222-3137
WHITE & ELLIS DRLG INC 401 E Douglas Suite 500 Wichita KS 67202 316-321-5050
WHITEHEAD E E DRLG CONTR P O Box 662 Drumright OK 74030 918-352-2230
WILCOX DRILLERS INC P O Box F F Natchez MS 39120 601-446-5021
WILLBAOS DRLG INC P O Box 10727 Midland TX 79703 915-692-3166
WILLIS DRLG CO INC P O Box 479 Edinburg TX 78539 512-383-3888
WILSON BROS DRLG CO P O Drawer 53628 Lafayette LA 70505 318-233-5950
WOOLF & MAGEE INC P O Box 6566 Tyler TX 75711 214-561-4051
WYOMING WELL SERV INC P O Box 350 Cody WY 82414 307-587-4249

X

XPLOR DRLG CO P O Box 18611 Wichita KS 67207 316-685-5372

Y

YOUNG DRLG CO P O Box 717 Farmington NM 87401 505-327-5218

Z

ZENITH DRLG CORP INC 505 Fourth Financial Center Wichita KS 67202 316-265-6697

U.S. Contract Rotary (Land) Drilling Rigs

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drawks	Rated Depth with 4½" Pipe
ALABAMA						
BALDWIN						
Justis-Mears Oil Co Inc	24	dsl	3600	Emsco J-1400	3060	22,000
Penrod Drlg Co	5	dsl-elec	3425	Emsco C-3	3200	30,000
CHOCTAW						
Tesoro Drlg Co	5		2000	National 80-B	1650	15,000
CLARKE						
Lama Drlg Co Inc	8	dsl	1300	National 100	1300	14,000
Penrod Drlg Co	106	dsl	1575	National 80-B	1760	15,000
	16	dsl	3075	Brewster N-12-A	1840	20,000
ESCAMBIA						
Chesley Pruet Drlg Co	16	dsl	3600	Con Emsco C-2	3600	30,000
FAYETTE						
Lohmann-Johnson Co Inc	9	dsl	300	National T-12	300	3,500
Warrior Drlg & Engr	4	dsl	145	Cardwell M-K	600	4,000
LAMAR						
Warrior Drlg & Engr	3	dsl	600	Gar-Den GD-500	600	9,650
MOBILE						
Exeter Drlg Southern Inc	32	dsl	2800	Gardner-Denver 1500	2800	25,000
Noble Drlg Corp	OW-21	dsl-elec	2800	OILWELL E-2000	2000	25,000
Penrod Drlg Co	12	dsl	3850	Gar-Den 1500	2120	20,000
Resource Drlg Inc	6	dsl	2330	National 110	2740	18,000
MONROE						
Noble Drlg Corp	N-131	dsl	2200	National 130	1625	20,000
WASHINGTON						
Murco Drlg Corp	10	dsl	2200	Brewster N-95	2400	20,000
Penrod Drlg Co	110	dsl	1600	National 1625-M	2200	
ALASKA						
UNDESIGNATED						
Brinkerhoff Drlg Co Inc	36	dsl	2100	National 110	2100	18,000
NATIONAL PETROLEUM RESERVE						
Parker Drlg Co	95	dsl	1800	National 130	1800	25,000
NORTH SLOPE						
Loffland Bros Co	162	dsl	2160	National 110	2400	20,000
Nabors Alaska Drlg Inc	25	dsl	2000	National 110	3000	19,000/5"
	1	cat	1700	Emsco A-800	1800	16,000
	17	dsl	2000	OILWELL 860	1740	19,000/5"
	18-E	dsl-elec	2000	Emsco Electrohoist	3900	25,000
	22-E	dsl-elec	3200	Emsco II-C Electrohoist	3600	25,000
Nabors Well Serv Inc	1-ES	dsl-elec	500	Emsco Electrohoist C-II	1800	20,000
Parker Drlg Co	128-HH	dsl	1100	OIME TBA-2000	1100	20,000
	135-HH/23	dsl	1500	OIME TBA-2000	1700	20,000
	141	dsl	1250	OIME TBA-2000	1800	20,000
	176	elec	2600	OIME 2000-E	3600	20,000
	191	dsl	4000	OIME 3000-E	4000	30,000
	96	dsl	2000	National 130	2000	25,000
	97	dsl	1500	National 80-B	1950	18,000
Rowan Drlg US	26	dsl	2000	National 110	1590	18,000
	29	dsl	1850	National 110	2400	20,000
	34	dsl-elec	2000	National 110-EH Special	3000	17,000
	35	dsl-elec	2000	National 110-EH Special	3000	17,000
WEST ARCTIC						
Parker Drlg Co	147	dsl	1500	OIME TBA-2000	1700	20,000
ARIZONA						
PINAL						
Morrow Drlg Co	2	dsl	680	Morrow 350	350	4,000
Parker Drlg Co	166	elec	3000	OIME 3000-E	3000	30,000
ARKANSAS						
COLUMBIA						
Kern Drlg Co Inc	1	dsl	350	Emsco GB-250-T	350	6,500
	2	gas	500	Emsco GB-350	500	8,500
	4	gas	700	Emsco GB-500	700	9,500
N & C Drlg Corp	1	dsl	2000	OIME SL-1000	1200	15,000
SH & J Drlg Corp	3	dsl	807			7,300
Sawyer Drlg & Serv Inc	2	dsl	400	Brewster N-4	400	8,500
CRAWFORD						
Astro Drlg Co	22	dsl	920	Bethlehem M-58	920	12,000
Miller Drlg Co	14	dsl	600	National 50	600	10,000
FRANKLIN						
Miller Drlg Co	105	gas	300	Brewster N-3	145	3,800
JOHNSON						
Astro Drlg Co	18	dsl	556	Ideco H-1000	940	12,000
ARKANSAS (Cont'd)						
JOHNSON (Cont'd)						
Miller Drlg Co	101	gas	450	National 50	450	7,000
	104	gas	450	National 50	450	8,000
	107	gas	450	Unit 15	450	8,500
Unit Drlg & Expl Co	10	unit U-15	1000	Beth M-58	1200	14,000
LAFAYETTE						
Kern Drlg Co Inc	7	dsl	1020	OILWELL 76	1020	12,500
Layton Oil Co	8	dsl	450	Cooper	300	6,500/3½"
Owen Drlg Co	7	dsl	635	Ideco H-35	504	5,000
SH & J Drlg Corp	2	btne	885	Brewster N-7	750	9,500
MILLER						
Justiss Mears Oil Co Inc	25	dsl	250	Emsco GC-350	450	12,000
Rosamond Drlg Co	5	dsl	1450	Bethlehem MC-450	1275	13,500
SH & J Drlg Corp	1	dsl	807	Cardwell O	800	10,000
Sawyer Drlg & Serv Inc	5	dsl	1500	Brewster N-75	1500	13,000
POLK						
Miller Drlg Co	112	dsl	350	Spencer-Harris 6000	300	6,000
POPE						
Miller Drlg Co	15	dsl	600	Spencer Harris	600	8,500
QUACHITA						
H F Hatcher & Son	3	gas	250	Wilson Mogul 42	225	5,000
SEBASTIAN						
Miller Drlg Co	102	gas	675	M-CSCO U-15	675	12,000
	103	gas	600	National 50	600	10,000
UNION						
Kern Drlg Co Inc	5	dsl	1050	OILWELL 76	1050	11,500
Shuler Drlg Co Inc	1	dsl	300	Brewster N-R	325	325
	3	dsl	300	Wilson Mogul	325	5,000
	4	gas-btne	600	Wilson Giant	600	8,000
	5	dsl	325	Spencer	350	5,000
	6	dsl	600	Wilson Giant	600	8,000
	7	dsl	400	Spencer-Harris 600		6,000
	8	dsl	450	Spencer-Harris 7000	400	7,000
CALIFORNIA						
UNDESIGNATED						
Bawden Drlg Inc	38	dsl	2100	OILWELL 940-E	1500	8,500/5"
COLUSA						
Hunnicutt & Camp Drlg Co	4	dsl	960	OILWELL 66	640	11,000/4"
	5	dsl	960	Ideco 525	480	9,000/4"
Loffland Bros Co	232	dsl	1000	M-CSCO U-15	1000	12,000
FRESNO						
Montgomery Drlg Co	14	dsl	1200	OILWELL 66	700	10,500/5"
HUMBOLDT						
Owen Jack Serv Co Inc	4	dsl	225	Ideco H-35	150	4,000
IMPERIAL						
Republic Drlg Co	6	dsl	1800	Brewster N-95	1800	18,000
KERN						
Atlantic Oil Co	10	dsl	680	National T-32	370	6,000
	16	dsl	1000	National 130	2475	20,000
	3	dsl	680	Ideco H-40	370	5,500
	5	dsl	680	National 50-A	680	9,000
Barnes Core Drlg Co	711-D	dsl	750		450	5,500
	D-6	dsl	750	Custom	450	5,500/3½"
Big-O Drlg	3	dsl	1100	National 100	1650	13,500
	5	dsl-elec	3200	Ideco Super 711	1600	18,000
	2	dsl	1200	National 75-CA	1200	10,500
Brea Drlg Co	1	dsl	165	Howard Turner	165	2,500
California Prod Serv Inc	M-17	dsl	300	Cardwell K-200-C	308	4,000
Cleveland Drlg Co	2	dsl	600	Sky/Brewster RR-400	450	5,000
Edwards Well Serv	D-30	dsl		Ideco	300	
Gary Drlg Co	1	dsl	450	Hopper	400	5,000
	D-12	dsl	382	Emsco GB-150-T	300	4,500
	D-13	dsl	450	Emsco GB-16-T	300	4,500
	D-30	dsl	300	Ideco 35		
	D-4	dsl	475	Emsco GB-160-T	450	4,500
	D-5	dsl	382	Hopper GT-34	300	2,500
	D-6	dsl	600	Emsco GB-160-T	400	4,500
	D-7	dsl	381	Gary Drlg	200	2,000
	D-8	dsl	450	Emsco GB-160-T	400	4,500
	D-2	dsl	800	National T-45	600	9,000
Golden State Drlg Inc	D-10	dsl	750	Custom Howard Turner	450	5,500/3½"
	D-10	dsl	750	Custom Howard Turner	450	5,500
	D-6	dsl	750	Custom Howard Turner	450	5,500

CALIFORNIA (Cont'd)

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drawwks	Rated Depth with 4½" Pipe
KERN (Cont'd)						
Hunnicutt & Camp Drlg Co	3	dsl	960	National CA-50	640	10,500/4"
Hylton Drlg Co	1	dsl	380	National T-12	300	4,000
	4	dsl	380	Howard Turner MR-10	150	3,000
	5	dsl	380	Ideco H-30	300	5,000
	7	dsl	300	National T-12	280	4,000
	8	dsl	380	Ideco H-30	300	5,000
Kenai Drlg West Coast Inc	6	dsl	400	Ideco H-40	400	6,500
	8	dsl	800	Wagner Morehouse T-2054	[illegible]	6,500
	8	dsl	875	Wagner Morehouse T-5054	[illegible]	7,000
Loffland Bros Co	16	dsl	1425	M-CSCO U-914-C	1600	18,000
	6	gas	1300	M-CSCO U-914-C	1600	14,000
Marlin West	Marlin 11	dsl-elec	2000	National 110	1600	14,000
	Marlin 12	dsl-elec	2000	National 110	1600	14,000
Montgomery Drlg Co	5	dsl-elec	2700	National 1320-UE	3645	25,000/5"
	1	dsl-elec	3200	National 1320-UE	3645	25,000/5"
	17	dsl-elec	2000	OILWELL 940-E	2000	20,000/5"
NECK Drlg Co	1	gas	350	Wilson Super	350	4,000
	2	gas	450	Wagner Morehouse	450	6,000
Pyramid Oil Co	15	dsl	400	Ideco H-30	300	3,000
Scandinavian Montgomery Drlg	3	dsl	1200	National 75	700	1,200/5"
	8	dsl	1200	National 75	700	1,200/5"
LAKE						
Atlantic Oil Co	11	gas		National 80-B	1350	14,000
	6	gas		National 80-B	1680	14,000
Montgomery Drlg Co	6	dsl	1400	Emsco GB-800	1200	13,000/5"
LOS ANGELES						
Atlantic Oil Co	15	dsl	680	National T-32	340	6,000
	8	gas	650	National T-32	370	6,000
Big Chief Drlg Co	18	dsl	500	Hopper GXTTA	450	6,000
Big-O Drlg Inc	4	dsl	1100	National 75-CA	900	12,500
	1	dsl	1200	OILWELL 66	800	9,500
California Prod Serv Inc	D-6	dsl	500	Hooper MTA	461	4,500
	D-7	dsl	1000	Hopper MTA	654	6,500
Finley Oilwell Serv Inc	11	dsl	736	Ideco H-30	318	3,500
	6	dsl	736	Ideco H-40	475	5,500
Gary Drlg Co	D-3	dsl	628	Emsco G-350	600	8,000
K L Kellogg & Sons	38	elec	1000	National 75	700	11,000
Kenai Drlg West Coast Inc	30	dsl	800	Ideco H-40	400	6,000
	2	dsl	2000	Emsco J-1250	2000	15,000
	29	dsl	900	Wilson Giant	1200	10,000
	30	dsl	800	Ideco H-40	400	6,500
	6	dsl	875	Emsco J-750	800	10,500
Peter Bawden Drlg Inc	10	dsl-elec	1500	OILWELL 940-E	1500	14,000
Pool Well Serv Co	38	dsl	520	Cabot 550	550	5,500
MONTEREY						
Gary Drlg Co	D-10	dsl	628	Hopper	400	5,500
	D-9	dsl	628	Franks	400	5,500
Melton Drlg Co	3	dsl	350	Wagner-Morehouse	350	4,000
ORANGE						
Atlantic Oil Co	12	dsl	850	National 50-A	680	9,000
	2	gas	1260	National 55	1260	11,000
	4	gas	900	National 55	900	10,000
Kenai Drlg West Coast Inc	24	elec	950	Wilson-Titan	1000	13,000
Loffland Bros Co	92	dsl-elec	2160	M-CSCO U-914-CE	2200	18,000
Thompson Drlg Co	2	dsl	900	Emsco GA-250-T	450	6,500
SAN JOAQUIN						
Owen Jack Serv Co Inc	2	dsl	150	Ideco H-38	350	4,000
Scandanavian Montgomery Drlg	11	dsl	1000	Emsco GB-800	1000	12,000/5"
	9	dsl-elec	2200	National 1320-UE	3000	22,000/5"
SANTA BARBARA						
Challenger Drlg	30-E	dsl-elec	3000	National 1320-UE	2400	25,000/5"
Kenai Drlg West Coast Inc	24	elec	800	Wilson Titan	1200	10,000
	29	dsl	1200	Wilson Giant		12,000
	4	dsl	800	Ideco	400	6,000
	5	dsl	800	National T-32	400	6,500
	9	dsl	800	Ideco H-400	400	6,000
	4	dsl	800	Ideco H-40-D	400	6,500
	5	dsl	800	National T-32	400	7,000
	7	dsl	800	Unit U-10	400	7,000
SHIELLS CANYON						
Peter Bawden Drlg Inc	27	dsl-elec	1500	Emsco 550-WE	750	12,000
SOLANO						
Cleveland Drlg Co	1	dsl	1200	OILWELL 96	1200	18,000
Owen Jack Serv Co Inc	3	dsl	150	Ideco H-35	150	2,500
	6	dsl	300	Ideco H-35	300	4,000
Peter Bawden Drlg Inc	11	dsl-elec	1706	Emsco A-800-WE	1000	12,000
SONOMA						
Loffland Bros Co	105	dsl-elec	2160	M-CSCO U-914-EC	2200	18,000
	27	dsl-elec	2160	M-CSCO U-20	2400	18,000
	50	dsl-elec	1420	M-CSCO U-712-A	1600	17,000
SUTTER						
Peter Bawden Drlg Inc	23	dsl-elec	1700	Emsco A-800-UE	1000	14,000
UNDESIGNATED						
Atlantic Oil Co	14	dsl		Ideco H-35		5,000
VENTURA						
California Prod Serv Inc	D-1	dsl	500	Hopper GXXTA	461	4,000
	D-3	dsl	300	Ideco H-37-D	461	4,500
	D-4	dsl	500	Hopper MTA	461	4,500
Gary Drlg Co	D-11	dsl	600	Emsco C-50	600	8,000
Kenai Drlg West Coast Inc	9	dsl	800	Ideco H-40-D	400	6,500
Loffland Bros Co	185	gas	1600	M-CSCO U-914-C	1900	17,000
	212	gas	1420	M-CSCO U-914-A	1600	18,000
	217	gas	1600	M-CSCO U-914-C	1900	18,000
Peter Bawden Drlg Inc	22	dsl-elec	1400	Emsco M-58	800	10,000
YOLO						
Atlantic Oil Co	7	gas	650	National T-32	450	6,000
Hunnicutt & Camp Drlg Co	1	dsl	950	National T-32	320	9,000/3½"
	2	dsl	1520	OILWELL 660	880	12,500/4"
Owens Jack Serv Co Inc	5	dsl	150	Ideco H-25	300	4,000

COLORADO

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drawwks	Rated Depth with 4½" Pipe
ADAMS						
Allison Drlg Co Inc	15	dsl	600	Brewster N-7	600	10,000
Exeter Drlg Northern Inc	6	dsl	330	National T-20	300	6,000
	2	dsl	375	Emsco GA-250	460	7,500
BACA						
Gabbert-Jones Inc	11	dsl	310	National T-20	275	5,000
Murfin Drlg Co	12	dsl	375	Bethlehem C-50	500	7,500
BOULDER						
Toltek Drlg Co	2	dsl	680	National 50	875	9,000
ELBERT						
Allison Drlg Co Inc	25	dsl	600	Wilson 38	600	10,000
GARFIELD						
Loffland Bros Co	12	dsl	840	Ideco Hydrair H-44-CSC	868	8,000
R L Manning Co	24	dsl	860	Brewster N-75	860	11,000
Veco Drlg Inc	2	dsl	425	Mayhew 5000	500	7,000
KIOWA						
Murfin Drlg Co	14	dsl	375	T-45	600	8,000
LA PLATA						
Brinkerhoff Drlg Co Inc	61	dsl	520	Ideco H-37	465	6,000
Brinkerhoff-Signal Inc	76	dsl	800	Gardner-Denver M-500	800	10,000
Cactus Drlg Corp	18	dsl	920	National T-32	626	8,000
Coleman Drlg Co	2	dsl	1100	Ideco H-40-D	636	8,000
	4	dsl	1300	Skytop/Brewster MOD-N-46	930	10,000
LAS ANIMAS						
Loffland Bros Co	223	dsl	1260	M-CSCO U-15	1000	9,000
LOGAN						
Exeter Drlg Northern Inc	13	dsl	350	Brewster N-4	300	6,000
Toltek Drlg Co	3	dsl	680	Brewster N-4	440	8,000
MESA						
Calvert Western Expl Co	9	dsl	900	National 300-B	350	5,000
Nicor Drlg Co	36	dsl	1200	Gardner-Denver 500	950	11,000
Tom Brown Inc	17	dsl	375	M-CSCO U-15-CA	500	9,000
Veco Drlg Inc	1	dsl	400	Failing 90	400	5,000
	4	dsl	600	M-CSCO	450	7,500
	5	dsl	1400	OIME 750	750	11,000
MOFFAT						
Atco Drlg Inc	28	dsl	400	National T-32	326	8,000/4"
Loffland Bros Co	186	dsl	2160	M-CSCO U-914-C	2400	20,000
	5	dsl	1220	Ideco H-1000	868	12,000
Parker Drlg Co	112	dsl	2700	Ideco 3000	2700	30,000
MORGAN						
Allison Drlg Co Inc	2	dsl	300	Cardwell KB-500	300	7,500
J W Gibson Well Serv Inc	84	dsl	550	Cabot/Franks 2042	700	10,000
	93	dsl	450	Franks M-1287	450	6,000
	75	dsl	450	Cardwell K-8500	450	8,000
PUEBLO						
Baski Drlg Inc	7	dsl	450	Ideco H-30-D	350	5,000
RIO BLANCO						
Atco Drlg Inc	18	dsl	326	326	320	8,000/4"
R L Manning Co	19	gas-btne	925	Bethlehem M-58	910	10,000
	23	dsl	800	Brewster N-45	654	7,500
Tierra Drlg Corp	16	dsl	650	Brewster 4K10	750	10,000
Veco Drlg Inc	7	dsl	1550	OIME 1000	1000	16,000
SAN JUAN						
Arapahoe Drlg Co	7	gas-btne	700	National T-45	700	10,000
SAN MIGUEL						
Brinkerhoff Drlg Co Inc	26	dsl	1170	National 55	1170	10,500
WASHINGTON						
Allison Drlg Co Inc	3	dsl	300	Cardwell KB-500	300	7,500

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drawwks	Rated Depth with 4½" Pipe
COLORADO (Cont'd)						
WASHINGTON (Cont'd)						
Teltek Drlg Co	1	dsl	440	Brewster N-4	440	7,000
WELD						
Allison Drlg Co Inc	1	dsl	450	Ideco 800	900	12,000
Exeter Drlg Northern Inc	1	dsl	500	National 50-A	750	9,500
	12	dsl	500	National T-45	750	9,500
	22	dsl	500	M-CSCO U-15	750	9,500
	25	dsl	375	M-CSCO U-15	480	8,500
	4	dsl	375	National T-32	460	8,000
YUMA						
Excell Drlg Co	2	dsl	275	Ewbanks	175	3,000
Western Well Drlg Inc	D-1	dsl	350	Failing 2000	350	2,500
	D-2	dsl	350	Failing H-2000	350	3,500
FLORIDA						
SANTA ROSA						
Penrod Drlg Co	15	dsl	3000	Gardner Denver 2100	2200	30,000
	19	dsl	2600	National 1320-M	3425	25,000
IDAHO						
CARIBOU						
Loffland Bros Co	57	dsl-elec	1800	National 80-B	2000	16,000
ILLINOIS						
CLAY						
Precision Expl Co Inc	2	dsl	400	National T-20	400	6,500/3½"
	5	dsl	400	National T-12	385	4,500
COOK						
Progress Drlg & Marine Inc	46	dsl-shaft	1000	Hughes CSD-820	400	2,000
CRAWFORD						
Gwaltney Drlg Inc	1	dsl	200	National T-12	165	3,000
EDWARDS						
Precision Expl Co Inc	1	dsl	400	National T-20	400	6,500/3½"
FRANKLIN						
Brahm Oil	1	dsl	602	M-CSCO U-15	602	9,000
GALLATIN						
Geo N Mitchell Drlg Co	4	dsl	400	Brewster N-4	400	6,000
	5	dsl	400	Brewster N-4	400	6,000
HAMILTON						
Gallagher Drlg Inc	7	dsl	350	National T-20	475	5,000
	7	dsl	350	National	475	6,000
MARION						
Geo N Mitchell Drlg Co	6	dsl	400	Wilson 38	400	4,000
Maz-Kar Oil Co	1	dsl				4,000
Nicor Drlg Co	20	gas	160	Failing 2500	260	25,000
RICHLAND						
Precision Expl Co Inc	3	dsl	400	National T-16	400	6,500/3½"
SALINE						
Big Seven Drlg Co	7	dsl	300	Emsco GB-250	380	6,000
	11	dsl	300	Emsco GB-160	300	4,000
UNDESIGNATED						
D L Davis Drlg Co Inc	1	dsl	200	Wilson Mogul	200	3,000
WABASH						
Beard Drlg Co	1	dsl	350	National T-12	350	4,500
Smith Drlg Co Inc	2	dsl	225	National T-8	238	2,500/3½"
WAYNE						
	9	dsl	320	National T-12	320	4,000
Barr Drlg Corp	1	dsl	378	National T-12	286	4,500
Brehm Oil	3	dsl	602	Brewster N-45	602	9,000
Gallagher Drlg Inc	4	dsl	500	Bethlehem S-45-E	476	6,000
Precision Expl Co Inc	4	dsl	400	National T-20	400	5,500
WHITE						
Brehm Oil	4	dsl	602	National T-20	602	9,000
Geo N Mitchell Drlg Co	7	dsl	400	Ideco 35	400	6,500
Harris Drlg Co	1		360	National T-12	320	4,000
	4	dsl	500	National 50	360	6,000
Kendall Drlg Co Inc	2	dsl	400	Brewster N-4	360	5,500
Snyder Drlg Well Serv Co	2	dsl	365	Bethlehem 545	325	6,500
	1	dsl	350	Brewster N-4	350	6,000
INDIANA						
GIBSON						
Royco Drlg Co	1	dsl	300	Cardwell	335	5,500
Smith Drlg Co Inc	7	dsl	250	Gardner Denver 2500	225	3,500/3½"
POSEY						
Gallagher Drlg Inc	5	dsl	300	National T-12	310	3,500
Kendall Drlg Co Inc	3	dsl	300	Brewster N-4	300	5,500
VANDERBURG						
J-V Drlg Co Inc	6	dsl	145	Speedstar SS-15-S	145	1,600/2⅜"
WARRICK						
J-V Drlg Co Inc	9	gas	85	Franks F	85	600/2⅜"

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drawwks	Rated Depth with 4½" Pipe
INDIANA (Cont'd)						
WAYNE						
Geo N Mitchell Drlg Co	1	dsl	400	S-45-A	400	6,000
KANSAS						
UNDESIGNATED						
Serch Drlg Co	1	dsl	340	National T-32	340	6,000
ALLEN						
Carter Land & Cattle Co Inc	1	dsl	250	Gardner Denver 1000	350	1,000
ANDERSON						
Carter Land & Cattle Co Inc	3	dsl	250	Gardner Denver 1000	350	1,000
BARBER						
Damac Drlg Inc	2	dsl	350	Wilson Giant	350	6,000
Graves Drlg Co Inc	1	dsl	300	Brewster N-4	400	6,000
H-30 Drlg Inc	77	dsl	375	Ideco H-40	500	8,000
Rains & Williamson Oil Co Inc	3	dsl	360	Brewster N-R	400	6,700
Slawson Drlg Co Inc	5	dsl	360	Ideco H-525	480	7,500
Sweetman Drlg Inc	1	dsl	750	National 370	750	9,000
Xplor Drlg Co	1	dsl	750	National T-32	750	8,500/4"
BARTON						
Bergman Drlg Inc	1	dsl	300	Emsco	300	5,500
Damac Drlg Inc	1	dsl	350	Wilson Giant	350	5,500
Duke Drlg Co	1	dsl	375	Unit	375	5,000
	2	dsl	250	National	250	5,000
L D Drlg Co	1	dsl	410	Bethlehem S-45-A	300	4,600
Red Tiger Drlg Co	4	dsl	700	Emsco Gas 250 Drawworks	700	5,000
	8	dsl	700	Emsco GA-250-T	700	5,000
Sage Drlg Co Inc	1	dsl	400	National T-32	400	6,500
White & Ellis Drlg Inc	2	dsl	425	Emsco GA-250	335	4,500
BUTLER						
Brandt Drlg Inc	1	dsl	350	Bethlehem S-50	335	4,500/3½"
Range Drlg Co Inc	1	dsl	360	Franks SAL-4500	440	3,500
Triangle Drlg of El Dorado	1	dsl	250	M-CSCO U-34	300	4,500
	2	dsl	335	M-CSCO U-34	300	4,500
White & Ellis Drlg Inc	3	dsl		National T-12		
	4	dsl		Emsco GA-250		
	5	dsl		Emsco GA-150		
CLARK						
Eagle Drlg Inc	1	dsl	8000	National 370	650	7,000
Pickrell Drlg Co	1	dsl	450	M-CSCO U-15	450	6,500
Rine Drlg Co	8	dsl	700	Brewster N-55	700	8,500
COMANCHE						
Gabbert-Jones Inc	6	dsl	275	National T-32	275	5,500
COWLEY						
Edco Drlg Co	6	dsl	400	Cardwell	290	4,500
Range Drlg Co	2	dsl	350	Wilson Giant	350	5,500
White & Ellis Drlg Inc	7	dsl	335	Unit U-34	425	4,000
DECATUR						
Excell Drlg	1	dsl	370	Cabot	175	3,000
EDWARDS						
D R Lauck Oil Co Inc	2	dsl	350	Brewster N-45	400	6,000
H-30 Drlg Inc	11	dsl	375	Ideco H-30	312	5,500
Sterling Drlg Co	4	dsl	450	M-CSCO U-15	285	5,000
ELK						
Edco Drlg Co	1	dsl	350	Sullivan	150	2,500
	3	dsl	150	Cardwell	150	800
ELLIS						
Buffalo Drlg Inc	1	dsl	500	Brewster N-4	400	6,000
C & R Drlg Co	7	dsl	425	National 370	425	7,500
Dreiling Oil Inc	1	dsl	320	Bethlehem C-50	440	6,000
	3	dsl	320	Brewster N-4	320	4,500
Murfin Drlg Co	8	dsl	300	National T-20	300	4,500
Red Tiger Drlg Co	9	dsl	700	Unit U-10	700	6,000
Shields Drlg Co Inc	2	dsl	300	Bethlehem C-50	300	5,500
FINNEY						
Abercrombie Inc	6	dsl	365	Ideco H-35	365	6,000
FORD						
Gabbert-Jones Inc	9	dsl	275	National T-32	310	5,500
GOVE						
Slawson Drlg Co Inc	3	dsl	480	Ideco H-35	480	7,000
GRAHAM						
Abercrombie Drlg Inc	1	dsl	365	M-CSCO U-34	365	5,000
	7	dsl	365	M-CSCO ''-34	365	5,000
John O Farmer Inc	4	dsl	400	Ideco H-30	400	5,000
Murfin Drlg Co	16	dsl	300	Emsco S-45-E Bethlehem	300	5,000
GRAY						
Slawson Drlg Co Inc	6	dsl	360	Ideco H-525	480	7,500
GREENWOOD						
Edco Drlg Co	2	dsl	318	Sullivan 318	290	2,500

KANSAS (Cont'd)

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
GREENWOOD (Contd)						
Edco Drlg Co	4	dsl	117	Diesel	280	4,500
HARPER						
Dunbar Drlg Co	3	dsl	300	Cardwell Model D	300	7,000
Gobbert-Jones Inc	8	dsl	310	National T-32	310	5,500
Slawson Drlg Co Inc	4	dsl	6500	Ideco H-30	360	7,500
HASKELL						
Damac Drlg Inc	6	dsl	550	Cabot BIR-550	450	6,000
HODGEMAN						
Freeman Drlg Co Inc	1	dsl	375	Ideco H-40	500	8,000
Rains & Williamson Oil Co Inc	2	dsl	360	OILWELL 52-T	400	6,700
White & Ellis Drlg inc	8	dsl	535	Emsco 350	670	7,500
KEARNY						
Service Drlg Co	10	dsl	454	M-CSCO	450	5,500
KINGMAN						
Brandt Drlg Inc	2	dsl	350	National 320	600	5,500
Red Tiger Drlg Co	1	dsl	450	Unit U-15	450	6,000
KIOWA						
Abercrombie Drlg Inc	11	dsl	600	Emsco 350	700	7,500
DNB Drlg Inc	2	dsl	500	National T-32	450	6,500
D R Lauck Oil Co Inc	1	dsl	350	M-CSCO U-15	400	6,000
H-30 Drlg Inc	5	dsl	510	Ideco H-35	510	6,500
White & Ellis Drlg Inc	9	dsl	535	Skytop Brewster N-46	950	10,500
LANE						
C-G Drlg Co Inc	1	dsl	300	Emsco GB-250-T	300	5,000
MARION						
Dunbar Drlg Co	1	dsl	250	Wilson	300	3,000/3½"
Kan-Go Inc	K3-B	dsl	365	Cabot/Franks	300	4,000
MC PHERSON						
Berentz Drlg Co	1	dsl	350	National T-12	325	3,500
	3	dsl	350	National T-12	350	3,500
Blackstone Drlg Inc	2	dsl	300	National T-20	300	4,000
	3	dsl	300	450-T BDW	300	5,000
MEADE						
Moran Drlg Corp	63	dsl	1050	National T-45	800	10,000
Sage Drlg Co Inc	2	dsl	400	OILWELL T-52	400	6,700
	7	dsl	400	Emsco 350	400	8,000
Zenith Drlg Corp Inc	7	dsl	550	Brewster N-4	500	7,000
MIAMI						
Dakota Drillers Inc	1	dsl	250	Portadrill	250	1,500
MONTGOMERY						
Layton Oil Co	2	dsl	180	Failing 1500	100	1,500/2⅞"
Turner-Winter Drlg Expl Co	2	dsl	900	Jaswell J-2400	900	2,400
MORTON						
Earl F Wakefield Inc	7	dsl	640	Emsco GB-160-T	640	5,000
Lohmann-Johnson Drlg Co Inc	11	dsl	325	National 50	600	6,000
Service Drlg Co	2	dsl	454	M-CSCO U-34	454	6,000
NEOSHO						
Carter Land & Cattle Co Inc	2	dsl	250	Gardner Denver 1000	350	1,000
NESS						
Abercrombie Drlg Inc	12	dsl	365	Beth Freeze	300	5,500
Pickrell Drlg Co	10	dsl	375	M-CSCO U-15	375	5,500
Rains & Williamson Oil Co Inc	7	dsl	360	Brewster N-4	460	5,500
	8	dsl	360	Brewster N-R	400	6,700
Slawson Drlg Co Inc	1	dsl	360	Ideco H-35	360	5,500
Strata Drlg Co	1	dsl	500	M-CSCO U-15	520	7,500
Warrior Drlg Inc	1	dsl		Emsco	400	5,000
NORTON						
Big Springs Drlg Inc	1	dsl	360	Bethlehem S-45-13	360	5,000
PAWNEE						
Husky Drlg Co Inc	1	dsl	270	M-CSCO U-15	270	6,000
Sterling Drlg Co	5	dsl	350	Emsco GB-350	600	7,000
	8	dsl	350	Gardner Denver 2000	350	2,800/3½"
PHILLIPS						
Abercrombie Drlg Inc	10	dsl	365	Franks Trl Mtd	220	4,500
	8	dsl	365	Bethlehem S-50	365	5,500
Banner Drlg Co	4	dsl	400	Apache 250-40	375	5,000
PRATT						
H-30 Drlg Inc	3	dsl	375	Ideco H-40	575	8,000
Murfin Drlg Co	19	dsl	525	Wilson Super Mogul 42	525	6,500
Red Tiger Drlg Co	6	dsl	700	Ideco H-35 Drawworks	700	5,500
RAWLINS						
Murfin Co	7	dsl	525	National T-32	300	5,000
RENO						
H-30 Drlg Inc	7	dsl	375	Ideco H-30	312	5,500

KANSAS (Cont'd)

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
RICE						
Red Tiger Drlg Co	3	dsl	700	Ideco H-35 Drawworks	700	5,500
Sterling Drlg Co	1	dsl	350	M-CSCO U-34	285	4,600
ROOKS						
Murfin Drlg Co	21	dsl	375	Ideco H-35	475	6,500
Red Tiger Drlg Co	2	dsl	700	Emsco GA-250 Drawworks	700	5,000
RUSH						
Dunne-Gardner Petr Inc	1	dsl	350	Emsco 250	350	5,000
Rockhold Engr Inc	3	gas		Cardwell RL	150	
RUSSELL						
Rains & Williamson Oil Co Inc	4	dsl	360	Unit U-34	400	5,500
Red Tiger Drlg Co	5	dsl	700	Unit U-15	700	6,000
	7	dsl	700	Emsco GA-250-T	700	5,000
SCOTT						
Rockhold Engr Inc	7	gas		Walker-Neer	200	
SEDGWICK						
Dunne-Gardner Petr Inc	2	dsl	400	Ideco H-35	400	7,000
SEWARD						
Damac Drlg Inc	5	dsl	350	Ideco DIR H-35	350	6,000
Lohmann-Johnson Drlg Co Inc	3	dsl	300	National 50	450	5,500
SHERIDAN						
Big Spring Drlg Inc	2	dsl	360	National T-32	360	5,500
STAFFORD						
Allen Drlg Co	1	dsl	476	National T-32	476	6,000
Slawson Drlg Co Inc	2	dsl	360	Ideco H-525	480	7,500
STANTON						
DNB Drlg Inc	1	dsl	450	OILWELL 52-T	450	6,500
STEVENS						
Earl F Wakefield Inc	1	dsl	440	M-CSCO U-34	440	5,000
SUMNER						
DNB Drlg Inc	3	dsl	450	National T-20	350	5,000
Dunne-Gardner Petr Inc	3	dsl	400	Challenger	400	6,000
THOMAS						
Abercrombie Drlg Inc	9	dsl	365	Bethlehem Breeze	365	5,500
Rains & Williamson Oil Co Inc	1	dsl	360	Bethlehem S-45-B	400	5,500
TREGO						
H-30 Drlg Inc	2	dsl	280	Ideco H-40	312	8,000
Murfin Drlg Co	15	dsl	300	National T-20	300	5,000

KENTUCKY

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
CUMBERLAND						
Miller Drlg Co Inc	8	dsl	400	Ingersoll-Rand	400	3,000
GARRARD						
Crescent Drlg Co	1	dsl	400	Bethlehem S-45-E	400	7,000
HENDERSON						
Crescent Drlg Co	4	dsl	400	Bethlehem S-45	400	4,000
NRG Drlg Co	1	dsl	335	National T-12	185	4,500
HOPKINS						
Crescent Drlg Co	8	dsl	400	Bethlehem S-45	400	5,000
Weal Drlg Co Inc	1	dsl	325	National T-12	335	4,000
	2	dsl	335	Cardwell S	335	4,000
JOHNSON						
Arden Drlg Co	2	dsl	800	Continental Emsco WS-1	800	12,000
OHIO						
J-V Drlg Co Inc	8	dsl	145	Speedstar SS-15-S	145	2,000/2⅞"
WEBSTER						
Kendall Drlg Co Inc	1	dsl	300	National T-12	300	3,500

LOUISIANA

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
UNDESIGNATED						
	114	dsl-elec	3300	M-CSCO U-1220-EBD	3300	30,000
Glasscock Drlg	61	dsl	1400	National 60-B	1250	13,500
	65	dsl	2200	National 110	1700	16,000
	63	dsl	2200	National 110	1700	16,000
Hardin Well Serv Inc	29	dsl	316	Ideco H-35	316	7,500
Harris Well Serv Inc	17	dsl	316	Ideco H-35	316	7,500
	18	dsl	316	Ideco H-35	316	7,500
	19	dsl	316	Ideco H-35	316	7,500
	21	dsl	316	Ideco H-35	316	7,500
	22	dsl	316	Ideco H-35	316	7,500
	23	dsl	316	Ideco H-37	480	8,000
	24	dsl	316	Ideco H-35	316	7,500
	25	dsl	632	Ideco H-44	632	10,000
	27	dsl	316	Ideco H-35	316	7,500
	28	dsl	316	Ideco H-35	316	7,500
	30	dsl	2000	Ideco 1200	1400	13,500
	31	dsl	316	Cooper LTD-350	316	7,500
	32	dsl	316	Ideco H-35	316	7,500

LOUISIANA (Cont'd)

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
UNDESIGNATED (Contd)						
Inland Well Serv Inc	6	dsl	800	Gardner Denver 700	700	12,000
Justiss-Mears Oil Co Inc	10	dsl	500	Brewster N-45	600	10,000
ACADIA						
Delta Drlg Co	31	dsl	2300	Emsco C-1	1560	20,000
Glasscock Drlg	68	dsl	2700	National 1320	2700	20,000
Great Southern Oil & Gas Inc	42	dsl	665	Ideco	636	10,000
Grey Wolf Drlg Co	1	dsl	1170	Emsco C-1	1170	16,000
	3	dsl-elec	3000	Emsco ECB	2000	25,000
MGF Drlg Co	44	dsl	2000	M-CSCO U-914	2324	17,000
	44	dsl	2000	M-CSCO U-914	1500	17,000
Penrod Drlg Co	27	dsl	3425	Emsco C-2	2200	25,000
Pernie Bailey Drlg Co	5	dsl	1500	National 55	1100	12,000
	7	dsl	1200	J-750	1200	11,000
The Power Rig Drlg Co Inc	12	dsl	3200	Emsco A-1500-M	2200	30,000
	20	dsl	1350	Emsco C-1	1350	18,000
Wilson Bros Drlg Co	9	dsl	2600	National 110	2700	20,000
ALLEN						
Circle Bar Drlg Co	1	dsl	2000	Ideco Super 7-11	2100	17,000
Nicklos Drlg Co	25	dsl	2000	Emsco A-1500	2119	20,000
AVOYELLES						
D & D Drlg Co	3	dsl	325	Brewster N-45	350	8,000
Energy Drlg Co Inc	H-35-S	dsl	400	Ideco H-35-S	540	9,000
Justiss-Mears Oil Co Inc	17	dsl	350	Beth S-45-E	35[illegible]	7,500
O'Neal Drlg Co	15	dsl-elec	2000	Gardner Denver 800	15[illegible]	18,000
BATON ROUGE						
Penrod Drlg Co	2	dsl	2600	Emsco C-2	[illegible]425	25,000
	29	dsl	3425	National 1320-M	2200	25,000
BEAUREGARD						
Loffland Bros Co	103	dsl-elec	3300	M-CSCO U-122[illegible]-EBD	3300	30,000
BIENVILLE						
Justiss Mears Oil Co Inc	15	dsl	450	Bethlehem 45-E	300	6,500
Mosley Well Serv Inc	7	dsl	1210	Cabot 1287	475	10,000/4"
Noble Drlg Corp	E-553	dsl	1400	Emsco A-550	1000	12,000
Sawyer Drlg & Serv Inc	9	dsl	800	Brewster N-45-M	800	10,000
	12	dsl	900	Wilson Giant	900	12,000
	1	dsl	700	Brewster N-7	700	11,000

LOUISIANA (Cont'd)

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
BOSSIER						
Butler-Johnson Inc	10	dsl	1500	Gardner Denver M-800	1500	14,000
N & C Drlg Corp	2	dsl	2000	OIME SL-1000	1200	15,000
Paramount Drlg Co Inc	9	dsl	1600	Emsco EDA	1600	15,000
CADDO						
Lanford Drlg Co Inc	1	dsl	150	Mayhew	150	1,000
Sawyer Drlg & Serv Inc	11	dsl	600	Wilson Giant	400	9,000
CALCASIEU						
Cliffs Drlg Co	18	dsl	1300	National 110	1300	20,000
Glasscock Drlg	64	dsl	2200	National 110	1700	16,000
	70	dsl	1600	National 80-B	1600	14,000
Great Southern Oil & Gas Inc	37	dsl	1000	Ideco	636	10,000
Grey Wolf Drlg Co	4	dsl	1500	Emsco GB-800	800	12,500
The Power Rig Drlg Co Inc	9	dsl	1850	Emsco A-800	1800	14,000
Woolf & Magee Inc	4	dsl	850	Bethlehem S-45-E	475	9,500/3½"
CALDWELL						
Butler-Johnson Inc	6	dsl	2000	Brewster N-85	1900	15,000
CAMERON						
Comet Drlg Co	12	dsl	1600	Cabot 1200	1200	13,500
Culver Drlg Co	11	dsl	2000	Gardner Denver 1100	1650	16,000
Delta Drlg Co	16	dsl	2300	National 130	2250	25,000
	65	dsl	2300	Emsco C-1	2331	18,000
Goldrus Drlg Co	15	dsl	1740	Bethlehem M-810	1560	16,000
	4	dsl	1200	Brewster N-75	1040	1,000
	9	dsl	1750	Bethlehem M-810	1560	16,000
Resource Drlg Inc	12	dsl	3105	National 1625	3740	30,000
	3	dsl	3105	National 1320	3740	25,000
	8	dsl	2330	National 110	2740	18,000
	9	dsl	2330	National 110	2740	18,000
The Power Rig Drlg Co Inc	16	dsl	2350	Brewster N-12-A	2800	20,000
Welsh Drlg & Serv Inc	15	dsl-elec	2700	M-CSCO 914-EU	3000	16,000
	17	dsl	2600	National 110-M	2550	16,000
	12	dsl	1300	National 100	1200	14,500
Woolf & Magee Inc	6	dsl	850	Bethlehem S-45-E	475	9,500/3½"
CLAIBORNE						
Butler-Johnson Inc	5	dsl	1800	Brewster N-95	1800	20,000
Lagersen Drlg Co	2	dsl	1700	M-CSCO GB-800	1500	15,000

Reduce costs with Emtec's sure-grip drilling centralizer.

Emtec's Sure-Grip Drilling Centralizer eliminates traditional stabilizer problems, providing you with maximum reliability and simplicity-of-operation while reducing costs. The field proven, advanced design of the Sure-Grip Centralizer eliminates rotary-shouldered connections—removing the possibility of washouts and other connection failures associated with conventional stabilizers.

The revolutionary slide-on design of Emtec's Sure-Grip Centralizer locks securely to any type drill collar—with an average adjustment time of less than 5 minutes. And, the one-piece integral blade design with unique locking system makes it virtually impossible to lose the tool downhole.

Sure-Grip's versatility is especially useful in directional drilling, and it weighs up to 75% less than ordinary stabilizers—lower air freight costs!

You can depend on Emtec, the engineering performance specialists—designing tools for the future. Ask about Emtec's new Non-Magnetic Centralizer. This tool permits directional drillers to run a non-magnetic drill collar at the rock bit, for more accurate measurement.

Call today for more information. EMTEC World Headquarters, 9110 Premier Row, Dallas, Texas 75247, (214) 630-2191, Telex: 73-2444.

EMTEC

STABILIZE

Circle 305 on Reader Service Card

LOUISIANA (Cont'd)

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
C' AIBORNE (Contd)						
Lama Drlg Co Inc	10	dsl	600	10 Wilson Mogul	600	8,000
Noble Drlg Corp	N-59	dsl	1400	National 55	700	12,000
	N-81	dsl	1300	National 80	1000	15,000
Par-Co Drlg Inc	1	dsl	300	Ideco H-30	300	6,000
Paramount Drlg Co Inc	3	dsl	900	Bethlehem S-45	550	10,000/3½"
Sawyer Drlg & Serv Inc	8	gas	1100	Brewster N-7	1100	11,500
Wheless Drlg Co	3	dsl	1800	Emsco C-1-3	1800	18,000
Wilson Bros Drlg Co	10	dsl	2200	National 110	2100	20,000
CONCORDIA						
D & D Drlg Co	1	dsl	325	Brewster N-4-A	350	8,000
Energy Drlg Co Inc	2	dsl		Ideco H-3-TS	500	9,500
New & Hughes Drlg Co Inc	5	dsl	450	Spencer Harris 5000	500	7,000
	3	dsl	450	Spencer Harris 6000	550	7,000
Penrod Drlg Co	108	dsl	1000	National 80-B	1760	15,000
Rebel Drlg Co	1	dsl	300	Brewster N-4	300	6,500
DE SOTO						
Butler-Johnson Inc	7	dsl	1200	National 55	1200	12,500
	9	dsl	1200	Gardner Denver 700	1200	12,000
Gibson Drlg Co	3	dsl	820	Wilson Mogul 42	666	6,500
Schlensker Drlg Corp	5	dsl	950	Unit U-15	950	10,000
The H & S Drlg Co	1	dsl	1700	Brewster N-95	2145	14,000
EAST BATON ROUGE						
Cliffs Drlg Co	24	dsl	1300	National 1320	1300	25,000
Comet Drlg Co	14	dsl	2600	Gardner Denver	3000	22,000
Glasscock Drlg	66	dsl	2700	National 1320	2700	20,000
Goldrus Drlg Co	3	dsl-elec	1700	OILWELL E-2000	3400	20,000
	5	dsl-elec	3400	OILWELL E-2000	1700	20,000
	14	dsl	1200	Brewster N-75	1176	13,000
	22	dsl	1250	Cabot 1000	872	13,500
Helmerich & Payne Intl Drlg Co	71	dsl	3300	National 1320-M	3300	26,000
	87	dsl-elec-		National 1625-M	4850	30,000
Merit Drlg Co	1	dsl	2800	OILWELL 2000-E	2000	25,000
Parker Drlg Co	175	dsl	3000	OIME Hercules 3000-E	3000	30,000
Resource Drlg Inc	1	dsl	3105	National 1320	3740	25,000
Tesoro Drlg Corp	3	dsl	2600	National 1320-M	2742	25,000
EAST FELICIANA						
Pernie Bailey Drlg Co	2	dsl	2000	80-B	1950	14,000
Wilson Bros Drlg Co	8	dsl	1750	National 110	1750	16,000
EVANGELINE						
MGF Drlg Co	42	dsl	2000	OILWELL 96	1542	14,500
	42	dsl	1500	OILWELL 96	1500	16,000
FELICIANA						
Cliffs Drlg Co	16	dsl	1300	National 1320	1300	25,000
FRANKLIN						
Butler-Johnson Inc	8	dsl	2300	Gardner Denver 1500	2200	20,000
IBERIA						
Delta Drlg Co	82	dsl-scr	3200	Emsco C-11	3648	25,000
Inland Well Serv Inc	15	dsl	2400	Brewster N-95	1600	18,000
	7	dsl	800	Gardner Denver	700	12,000
Noble Drlg Corp	PB-1	dsl	2450	Gardner Denver 1500	2000	20,000
The Power Rig Drlg Co Inc	11	dsl	2700	Emsco A-1500	2000	25,000
Wilson Bros Drlg Co	11	dsl	2400	National 110	2700	20,000
IBERVILLE						
American Well Serv Drlg Inc	11	dsl	1600	Brewster HI-4610A-38	575	8,000
Atlantic Pacific Marine Corp	4	dsl	2472	Emsco A-1500	2472	25,000
Comet Drlg Co	4	dsl	1250	Brewster N-75	750	12,000
Great Southern Oil & Gas Co	5	dsl	500	Wilson	318	7,000
MGF Drlg Co	46	dsl	2000	Ideco Super 7-11	2346	17,000
	46	dsl	1800	Ideco S-7-11	1500	17,000
Pearnie Bailey Drlg Co	1	dsl	1500	Brewster N-75	850	12,000
Wilson Bros Drlg Co	7	dsl	1400	National 80-B	1400	12,500
JACKSON						
Circle Bar Drlg Co	4	dsl	1300	OILWELL 96	1500	15,000
Paramount Drlg Co Inc	10	dsl	1350	National 75-CB	1350	14,000
JEFFERSON DAVIS						
Atlantic Pacific Marine Corp	3	dsl	1250	National 110	1300	15,000
Comet Drlg Co	10	dsl	1600	Cabot 900	900	10,500
Culver Drlg Co	10	dsl	1850	National 110	1650	16,000
Goldrus Drlg Co	16	dsl	1250	Bethlehem MA-810	1176	13,000
MGF Drlg Co	47	dsl	2250	Ideco Super 7-11	2346	17,000
	47	dsl	1800	Ideco S-7-11	1500	17,000

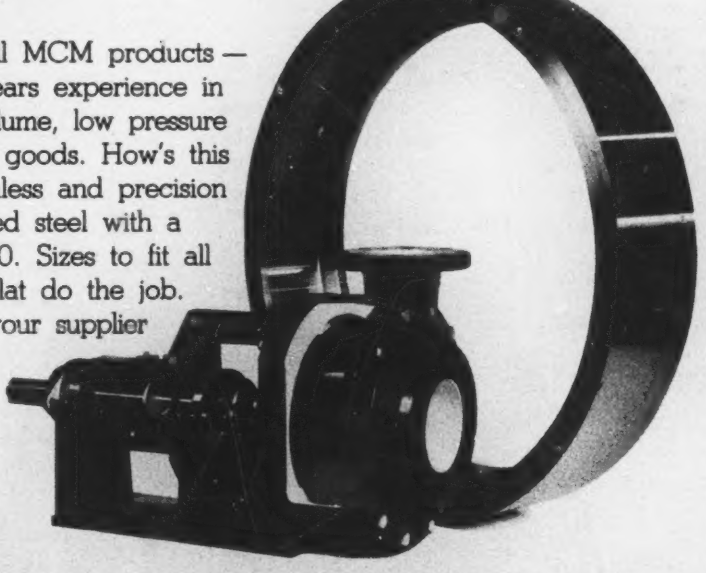
PERFORMANCE, DURABILITY, QUALITY, DEPENDABILITY, ENGINEERING, DESIGN, RELIABILITY, ETC.

Everything you ever wanted is in all MCM products — and more. For instance, over 25 years experience in designing and manufacturing high volume, low pressure centrifugal pumps. They deliver the goods. How's this for brake flanges: surfaces are seamless and precision ground. Made of heat treated, forged steel with a Brinnell Hardness rating of 300 - 350. Sizes to fit all popular types of drawworks. They flat do the job. MCM pumps and brakes — contact your supplier or call direct.

M-M

MCM Enterprises ☐ P.O. Box 95025 ☐ Oklahoma City, Ok. 73143 ☐ 405/236-3036

Circle 306 on Reader Service Card



LOUISIANA (Cont'd)

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
JEFFERSON DAVIS (Contd)						
Pernie Bailey Drlg Co	6	dsl	3000	National 110-M	3000	18,000
The Power Rig Drlg Co Inc	7	dsl	1850	Emsco A-800	1800	12,500
Wilson Bros Drlg Co	2	dsl	1900	National 110	1900	20,000
Woolf & Magee Inc	11	dsl	850	Bethlehem S-45	475	9,500/3½"
LA SALLE						
Justiss-Mears Oil Co Inc	37	dsl	200	JFJ-500	225	5,000
LAFAYETTE						
American Well Serv & Drlg Inc	14	dsl	1600	Brewster H1-46-10-A	575	10,500
Comet Drlg Co	6	dsl	1600	Ideco Super 7-11	1600	16,500
Delta Drlg Co	97	dsl	2000	Emsco J-1100	1560	16,000
	35	elec-scr	2550	Emsco C-1 Type II	2592	20,000
Dual Drlg Co	11	dsl	2400	OILWELL 860	1400	19,000
Goldrus Drlg Co	8	dsl-elec	1750	OILWELL 840-E	1700	18,000
Grey Wolf Drlg Co	6	dsl-elec	3000	Emsco C-II	2000	25,000
	8	dsl-elec	3000	Emsco C-Z II	2000	25,000
The Power Rig Drlg Co Inc	18	dsl	3200	Emsco C-2	2000	25,000
LAFOURCHE						
Cliffs Drlg Co	33	dsl	1000	National 80-B	1000	14,500
Glasscock Drlg	62	dsl	2000	National 110	1700	16,000
Goldrus Drlg Co	11	dsl	1500	Brewster N-12-A	2000	16,000
	7	dsl	1750	Brewster N-95	1560	16,000
Grey Wolf Drlg Co	7	dsl-elec	3000	Emsco C-11	2000	25,000
Murco Drlg Corp	26	dsl	2800	OILWELL N-2000-B	3000	30,000
Parker Drlg Co	2	dsl	1200	OIME SL-1000-P	1200	14,000
The Power Rig Drlg Co Inc	17	dsl	2000	Ideco 7-11	2000	16,000
	8	dsl	2000	Ideco 7-11	2000	15,000
LINCOLN						
Chesley Pruet Co	15	dsl	4800	Emsco C-3	4800	30,000
Murco Drlg Corp	18	dsl	2800	M-CSCO U-1220	2400	25,000
Noble Drlg Corp	N-812	dsl	1420	National 80-B	1420	15,000
Pool Well Serv Co	229	dsl	379	Cabot 750	750	5,500
Remco Drlg Co	1	dsl	900	Cabot 2042	475	10,000
Sawyer Drlg & Serv Co	10	gas	1200	Wheland 1000	1200	13,000
	7	gas	900	Ideco 750	900	12,500
Wheless Drlg Co	2	dsl	1200	Brewster N-7	1200	10,500
LIVINGSTON						
Dual Drlg Co	22	dsl	3200	National 1320-M	2000	22,000
Helmerich & Payne Intl Drlg Co	74	dsl	3740	OILWELL M-3000	3740	30,000
	79	scr	2200	National 110	1500	20,000
Loffland Bros Co	145	dsl	2955	M-CSCO U-1220	2955	20,000
	116	dsl-elec	3200	M-CSCO U-1220-EBD	3000	32,000
Penrod Drlg Co	9	dsl	2600	National 1320-M	3425	25,000
Resource Drlg Inc	10	dsl	2330	National 110	2740	18,000
	11	dsl	3105	National 1625	3740	30,000
The Power Rig Drlg Co Inc	14	dsl	2700	Emsco A-1500	2805	25,000
MOREHOUSE						
TR Drlg Co Inc	3	dsl	300	Bethlehem S-45-A	200	3,500
NATCHITOCHES						
Justiss-Mears Oil Co Inc	35	dsl	1250	Emsco J-1400	1200	18,000
	7	dsl	1800	Emsco J-1400	2900	20,000
	9	dsl	800	Emsco GC-500	1200	12,500
ORLEANS						
Inland Well Serv Inc	14	dsl	2400	Brewster N-95	1600	18,000
OUACHITA						
Justiss-Mears Oil Co Inc	14	dsl	800	Emsco GB-500	900	11,000
	22	dsl	1800	National 80-B	1420	14,000
PLAQUEMINES						
Inland Well Serv Inc	11	dsl	500	National 55	1100	10,000
Sanders Workover & Drlg	1	dsl	900	Emsco A-800	1100	14,000
POINTE COUPEE						
Cliffs Drlg Co	28	dsl	1300	National 1320	1300	25,000
	30	dsl	1300	National 1320	1300	25,000
Delta Drlg Co	25	dsl	2300	Emsco C-1	2592	18,000
	76	dsl-scr	3200	Gardner Denver 3000-RE	4600	30,000
Dual Drlg Co	9	dsl	3200	National 1320-M	2000	25,000
Eagle Prod & Drlg Serv Inc	3	dsl-elec	3300	OILWELL E-2000	2000	25,000
Eljay Drlg Corp	1	dsl-elec	2800	OILWELL E-2000	2000	25,000
	2	dsl-elec	2800	OILWELL E-2000	2000	25,000
Helmerich & Payne Intl Drlg	45	dsl-elec	3000	National 1320-UE	3000	26,000
MGF Drlg Co	401	dsl-elec	3000	National 1320	3000	25,000
Merit Drlg Co	4	dsl	2800	OILWELL 2000-E	2000	25,000
Noble Drlg Corp	25	dsl	3300	National 1625-DE	3000	30,000
Parker Drlg Co	165	dsl	3000	OIME Hercules 3000-E	3000	30,000
	174	dsl	3000	OIME Hercules 3000-E	3000	30,000
	180	dsl	3000	OIME Hercules 3000-E	3000	30,000
Penrod Drlg Co	1	dsl	3425	National 1625-M-6	2200	30,000
	17	dsl	2600	National 1320-M	3425	25,000
	28	dsl	3425	National 1320-M	2200	25,000
	4	dsl	3425	Emsco C-3	2200	30,000
Pernie Bailey Drlg Co	4	dsl	2900	National 1320-M	3000	20,000
The Power Rig Drlg Co Inc	19	dsl	3300	Emsco C-3	2000	25,000

LOUISIANA (Cont'd)

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
RED RIVER						
Murco Drlg Corp	34	dsl	2200	OILWELL N-760	1350	15,000
RICHLAND						
Justiss-Mears Oil Co Inc	11	dsl	1200	Emsco GB-800	1600	14,000
RUSTON						
Pool Well Serv Co	61	dsl	450	Pool	500	5,500
SABINE						
Helmerich & Payne Intl Drlg Co	77	dsl	2100	National 110	2000	20,000
ST BERNARD						
Atlantic Pacific Marine Corp	7	dsl	1600	OILWELL E-2000	2000	25,000
	8	dsl	1600	OILWELL E-2000	2000	25,000
ST CHARLES						
Chiles Drlg Co	7	dsl	1600	National 0-610	1000	12,000
Delta Drlg Co	83	dsl	2600	Emsco C-1	2331	18,000
Dual Drlg Co	15	dsl	2600	Wilson 150-A	1650	19,000
MGF Drlg Co	41	dsl	1700	OILWELL 96	2060	14,500
	41	dsl	1600	OILWELL 96	1600	15,000
The Power Rig Drlg Co Inc	15	dsl	2350	Emsco 1013-B	2265	16,000
ST JAMES						
Mallard Well Serv Inc	14	dsl	1300	Wilson 90	800	14,500
ST LANDRY						
Cliffs Drlg Co	27	dsl	1300	National 1320		25,000
Glasscock Drlg	69	dsl	2700	National 1320	2700	20,000
Grey Wolf Drlg Co	2	dsl-elec	3000	Emsco C-11	2000	25,000
Helmerich & Payne Intl Drlg Co	37	dsl	3270	OILWELL M-2000	3270	22,000
Loffland Bros Co	167	dsl	2160	M-CSCO U-914-C	2400	20,000
	115	dsl-elec	3200	M-CSCO U-1220-EBD	3000	28,000
MGF Drlg Co	43	dsl	2250	OILWELL 96	2324	18,000
	43	dsl	1800	OILWELL 96	1200	18,000
Penrod Drlg Co	10	dsl	2600	National 1320-M	3425	25,000
Wilson Bros Drlg Co	6	dsl	2600	National 1320	2700	30,000
Woolf & Magee Inc	12	dsl	850	Ideco H-35-S	475	10,000/4"
ST MARTIN						
Atlantic Pacific Marine Corp	1	dsl	2750	OILWELL	2750	20,000
Comet Drlg Co	8	dsl	1600	Cabot 1200	1200	13,500
Inland Well Serv Inc	5	dsl	660	National 55	900	10,000
Wilson Bros Drlg Co	1	dsl	1400	National 80-B	1400	12,500
ST MARY						
Goldrus Drlg Co	2	dsl-elec	2000	OILWELL E-2000	2000	25,000
Inland Well Serv Inc	2	dsl	500	Emsco 1100	1000	10,000
Penrod Drlg Co	8	dsl	2600	National 1320-M	3425	25,000
Wilson Bros Drlg Co	5	dsl	2500	National 110-M	2200	20,000
ST TAMMANY						
Nicklos Drlg Co	79	dsl-elec				
TENSAS						
New & Hughes Drlg Co Inc	9	dsl	450	Spencer Harris 5000	550	7,000
TERREBONNE						
Cliffs Drlg Co	26	dsl	1000	National 110	1000	16,000
Parker Drlg Co	162	dsl	2200	OIME SL-1500-P	2200	20,000
Progress Drlg & Marine Inc	21	dsl	1850	M-CSCO U-914-C	1650	16,000
Sanders Workover & Drlg	2	dsl	3200	Brewster N-12-A	3000	25,000
UNDESIGNATED						
E Jay Drlg Corp	3	dsl-scr	3200	OILWELL E-3000	3000	30,000
Harris Well Serv	33	dsl	900	Ideco H-44	900	10,000
Richards Operating Co	9	dsl-elec	3400	OILWELL E-3000	3000	30,000
Santa Fe Drlg Co	120	dsl-elec	3400	Emsco C-311-E	3000	25,000
	121	dsl-elec	3400	OILWELL 2000-E	3000	25,000
	95	dsl-elec	2800	OILWELL E-2000	1500	20,000
UNION						
Justiss-Mears Oil Co Inc	16	dsl	600	Emsco GB	900	12,000
	31	gas-btne	500	Wilson Giant Roadair	650	10,000
Murco Drlg Corp	3	dsl	300	Spencer Harris 3500	400	5,000
Sawyer Drlg & Serv Inc	4	dsl	1000	Brewster N-7	1000	12,500
Underwood Oil Well Serv Inc	12	dsl	350	Brewster N-13	350	4,000/3½"
VERMILION						
Amoy Drlg & Well Serv Corp	40	dsl	2300	National 1320	2300	12,000
Atlantic Pacific Marine Corp	5	dsl	1854	Emsco A-1500	1854	20,000
Cliffs Drlg Co	31	dsl	1300	National 110	1300	20,000
Delta Drlg Co	47	dsl	2300	National 130	2250	20,000
	85	dsl-scr	2900	Emsco C-11	3456	25,000
Goldrus Drlg Co	21	dsl	1200	Cabot 1000	872	13,500/4"
Grey Wolf Drlg Co	5	dsl-elec	3000	Emsco EDA	2000	25,000
Noble Drlg Corp	OW-31	dsl-elec	2600	OILWELL E-3000	3000	25,000
Penrod Drlg Co	18	dsl	3000	National 1625	2200	30,000
Pernie Bailey Drlg Co	3	dsl	2000	Brewster N-12		18,000

LOUISIANA (Cont'd)

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
VERMILION (Contd)						
The Power Rig Drlg Co Inc	21	dsl	2800	Emsco A-1500	2000	25,000
Wilson Bros Drlg Co	12	dsl	1850	National 110	1850	16,000
	3	dsl	2700	National 1320	2200	30,000
	4	dsl	2600	National 110	2700	20,000
WASHINGTON						
Delta Drlg Co	93	dsl-scr	2000	Emsco D-3	2592	16,000
Dual Drlg Co	21	dsl	2600	Emsco C-1	1500	22,000
Tesoro Drlg Co	4	dsl	2600	National 1320-M	2742	25,000
	6	dsl	2600	National 1625-M	2742	30,000
WEBSTER						
Butler Johnson Inc	4	dsl	1200	Brewster N-75	1200	12,500
	1	dsl	1900	Brewster N-85	1900	15,000
Lagersen Drlg Co	3	dsl	2650	OILWELL 96	2400	20,000
Murco Drlg Corp	6	dsl	2200	Brewster N-95	1000	14,000
Nelson Drlg & Well Serv Inc	1	dsl	600	Spencer Harris 7000	500	9,000/4"
Sawyer Drlg & Serv Inc	6	gas	1200	Brewster N-75	1200	13,000
Transcontinental Drlg Co Inc	22	dsl	600	Brewster N-7	600	11,000
WEST BATON ROUGE						
Helmerich & Payne Intl Drlg Co	73	dsl-elec	3270	OILWELL 3000-M	3270	30,000
Penrod Drlg Co	11	dsl	2600	National 1320-M	3425	25,000
WEST FELICIANA						
Amoy Drlg & Well Serv Corp	55	dsl	1500	National 110	1500	16,000
Cliffs Drlg Co	32	dsl	1300	National 110	1300	20,000
Delta Drlg Co	96	dsl-elec	2600	Emsco C-1 Type II	3456	2,000
WINN						
Murco Drlg Corp	46	dsl	2800	OILWELL E-2000	2000	30,000

MICHIGAN

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
CALHOUN						
Don Scott Drlg Co	5	dsl	550	Ideco H-1000	900	8,000
Nicor Drlg Co	23	dsl	320	National T-12	290	5,000
CLARE						
T D Provins Drlg Co Inc	5	dsl	600	Ideco 1000	1000	10,000
EATON						
James Bigard Drlg Co	1	dsl	535	Ideco H-35	318	5,500
GRAND TRAVERSE						
Cactus Drlg Corp	28	dsl	1070	National 50-A	800	10,000
L & G Drlg Co	2	dsl	500	Wilson 65	600	8,000
Nicor Drlg Co	21	dsl	720	Ideco H-35	510	7,500
	22	dsl	510	Ideco H-35	720	7,500
Ratliff Drlg Co	12	dsl	700	Gardner Denver 500-M	700	12,000
GRATIOT						
T D Provins Drlg Co Inc	1	dsl	500	Cooper 5656	350	4,000
INGHAM						
James Bigard Drlg Co	5	dsl	600	Wilson 65	535	7,000
ISABELLA						
James Bigard Drlg Co	3	dsl	600	Franks Cabot 550	550	7,500
KALKASKA						
Cactus Drlg Corp	12	dsl	1000	OILWELL 66	800	10,000
James Bigard Drlg Co	10	dsl	700	Ideco H-44	600	8,500
L & G Drlg Co	3	dsl	500	Emsco GB-350	600	10,000
T D Provins Drlg Co Inc	3	dsl	600	Ideco 1000	1000	10,000
	6		600	Ideco 700	700	9,000
LAPEER						
James Bigard Drlg Co	7	dsl	600	Ideco H-37	535	7,500
MANISTEE						
Cactus Drlg Co	16	dsl	1070	National 50-A	850	10,000
James Bigard Drlg Co	8	dsl	600	Ideco H-44	600	8,500
Nicor Drlg Co	24	dsl	850	Ideco H-525	850	10,000
MISSAUKEE						
James Bigard Drlg Co	9	dsl	600	Ideco H-44	600	8,500
MONTMORENCY						
Michigan Consolidated Gas Co	4	dsl	500	Ideco DIR-7015	600	7,500
OTSEGO						
T D Provins Drlg Co Inc	4	dsl	600	Cooper 550	500	8,000
PRESQUE ISLE						
Cactus Drlg Corp	17	dsl	1000	Brewster N-55	800	11,000
ROSCOMMON						
L & G Drlg Co	1	dsl	398	Ideco H-35	398	5,000
WEXFORD						
Cactus Drlg Corp	21	dsl	1000	Bethlehem M-58	800	12,000

MISSISSIPPI

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
ADAMS						
Eagle Drlg Corp	1	dsl	318	1968 Gardner Denver 3000	220	3,000

MISSISSIPPI (Cont'd)

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
ADAMS (Contd)						
Lama Drlg Co Inc	1	dsl	600	Ideco H-4	350	9,000/4"
Rebel Drlg Co	H-30	cat	300	Ideco H-30	300	8,000
CLAIBORNE						
Goldrus Drlg Co	6	dsl-elec	3400	OILWELL E-2000	1700	20,000
CLARKE						
Marion Drlg Co Inc	4	dsl	2400	Emsco Model C-2	2400	25,000
CLAY						
Apollo Drlg & Expl Inc	5	dsl	500	National 370	550	9,000
Crescent Drlg Co	7	dsl	1200	Bethlehem Toro	1200	12,000
COPIAH						
Marion Drlg Co Inc	6	dsl	3300		3300	30,000
COVINGTON						
Delta Drlg Co	66	dsl-elec	2300	Emsco Electrohoist II	3456	18,000
Penrod Drlg Co	7	dsl	3425	National 1625-M-6	2200	30,000
FORREST						
Welsh Drlg & Serv Inc	11	dsl	1750	OILWELL 76	1605	12,500
FRANKLIN						
Helmerich & Payne Intl Drlg Co	40	dsl	1545	OILWELL 860	1545	20,000
Rebel Drlg Co	2	dsl	325	Bethlehem S-45	325	7,500
GEORGE						
Chesley Pruet Drlg Co	12	dsl	3600	Emsco C-2	3600	25,000
GREENE						
Lama Drlg Co Inc	5	dsl	1000	National 75	1000	13,500/4"
HOLMES						
New & Hughes Drlg Co Inc	6	dsl	450	Bethlehem C-50	600	11,000
JASPER						
Exeter Drlg Southern Inc	15	dsl	2550	Gardner Denver 1100	1550	18,000
New & Hughes Drlg Co Inc	80-B	dsl	1200	National 80-B	1200	15,000
Rapad Drlg Co	2	dsl	1800	Emsco GB-500	1200	13,500
JEFFERSON DAVIS						
Delta Drlg Co	56	dsl	2600	Wilson Super 250	2592	25,000
Dual Drlg Co	7	dsl	2800	National 1320-M	2000	25,000
Murco Drlg Corp	22	dsl	2400	Brewster N-95	2400	20,000
JONES						
Lama Drlg Co Inc	7	dsl	1740	National 100	1740	15,500
Rapad Drlg Co	4	dsl-elec	2000	Emsco C-1	4000	25,000
LAMAR						
Chesley Pruet Drlg Co	14	dsl	3600	Gardner Denver 1500	3600	25,000
Marion Drlg Co Inc	2	dsl	2400	Emsco C-1	2400	20,000
Penrod Drlg Co	109	dsl	2000	Brewster N-75-A	1760	
LAWRENCE						
Eagle Prod & Drlg Serv Inc	2	dsl-elec	3300	OILWELL E-2000	2000	25,000
Exeter Drlg Southern Inc	26	dsl	2500	95 Brewster	2500	17,500
Marion Drlg Co Inc	1	dsl	1800	Emsco Model M-810	1800	16,000
Transcontinental Drlg Co Inc	8	dsl	1700	National 110	2325	17,500
MARION						
Exeter Drlg Southern Inc	16	dsl	2600	Gardner Denver 1500	2600	25,000
	27	dsl	2800	Gardner Denver 1500	2800	25,000
Helmerich & Payne Intl Drlg Co	75	dsl	3740	National 1625-M	3740	30,000
Loma Drlg Co Inc	9	dsl	1000	Wilson Titan	1000	12,000/4"
Marion Drlg Co Inc	5	dsl	2400	OILWELL M-2000	2400	25,000
Penrod Drlg Co	14	dsl	3075	Brewster N-12-A	1840	20,000
	24	dsl	2600	Brewster N-12-A	1950	25,000
Rapad Drlg Co	3	dsl-elec	4000	Gardner Denver 1500-E	2000	25,000
Tesoro Drlg Corp	1	dsl	2300	National 130-M	2742	20,000
	2	dsl	2300	National 1320-M	2742	20,000
Transcontinental Drlg Co Inc	4	dsl	2150	OILWELL 96	2550	21,000
MONROE						
Warrior Drlg & Engr	2	dsl	360	Unit 15	300	4,000
RANKIN						
Helmerich & Payne Intl Drlg Co	86	dsl-elec		National 1625-DE	3850	30,000
	72	dsl	3270	OILWELL 3000-M	3270	30,000
Loffland Bros Co	330	dsl	2400	M-CSCO U-1220	2775	22,000
Penrod Drlg Co	21	dsl	2600	National 1320-M	1950	15,000
	6	dsl	3425	National 1625-M-6	2200	30,000
SIMPSON						
Goldrus Drlg Co	1	dsl-elec	2000	OILWELL E-3000	3000	30,000
Transcontinental Drlg Co Inc	2	dsl	1700	OILWELL 96	1500	16,000
WALTHALL						
Noble Drlg Corp	E-1102	dsl	2800	Emsco A-1100	1800	18,000

MISSISSIPPI (Cont'd)

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
WALTHALL						
Noble Drlg Corp	E-1102	dsl	2200	Emsco A-1100	1800	18,000
WAYNE						
Justiss-Mears Oil Co Inc	23	dsl	1800	Emsco J-1100	2400	20,000
Loffland Bros Co	328	dsl	2160	National 130	2400	22,500
New & Hughes Drlg Co Inc	7	dsl	500	M-CSCO U-34	525	8,000
	14	dsl	1500	Emsco C-2	2000	22,000
WILKINSON						
Energy Drlg Co Inc	1	dsl	350	Bethlehem S-45-A	350	7,000
Wilcox Drillers Inc	4	dsl	350	Ideco H-30	350	8,500

MONTANA

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
UNDESIGNATED						
Bird Oil Equipment Ltd	4	dsl		Emsco GB-350	600	8,500
BEAVERHEAD						
Viersen & Cochran Drlg Co	13	dsl	1850	National 80-B	1500	18,000
BLAINE						
K 9 Drlg Co	1	dsl	278	Cardwell K-150 Double Drum	185	4,500
	2	dsl	278	Cardwell AH-91 Single Drum	185	3½"
CHOUTEAU						
Comanche Drlg Co	5	dsl	430	Ideco H-30	400	5,000
DAWSON						
Nicor Drlg Co	26	dsl	600	National 50-A	425	11,500
Ratliff Drlg Co	5	dsl	1100	National 75-CA	1100	15,000
FALLON						
Drilcon Inc	3	dsl	1176	National 50-A	784	10,000
Noble Drlg Corp	N-57	dsl	900	National 55	700	11,500
FERGUS						
Molen Drlg Co Inc	1	dsl	350	Emsco GB-250-T	350	5,500
GLACIER						
General Well Serv Inc	21	dsl	450	Cooper LTD-550	400	6,000/3½"
	6	dsl	450	Cardwell KB-210-A	400	5,000/3½"
Molen Drlg Co Inc	2	dsl	800	Skytop/Brewster N-46	800	10,000
	3	dsl	700	National 50-A	700	9,000
	4	dsl	1350	Skytop/Brewster N-75A	1350	14,000
GRANITE						
Enopco	1	dsl	2430	National 110-M	2430	20,000
HILL						
Elenburg Explor Inc	8	dsl	420	Walker-Neer CC-2000	180	2,500
LAKE						
Comanche Drlg Co	1	dsl	430	Ideco H-30	400	5,000
LIBERTY						
Comanche Drlg Co	2	dsl	430	Ideco H-30	400	5,000
Elenburg Expl Inc	10	dsl	350	Harold Lee Engineer	350	5"
MC CONE						
Bomac Drlg	25	dsl	1650	Bethlehem 810		
Noble Drlg Corp	N-89	dsl	1200	National 80-B	1000	13,000
MUSSELSHELL						
Soape Drlg Co	1	dsl	950	National 45	950	7,500
True Drlg Co	4	gas-LPG	350	Emsco GA-250-T	500	6,500
PHILLIPS						
Elenburg Explor Inc	2	dsl	420	Walker-Neer CC-2000	180	2,500
PONDERA						
Aspen Drlg Co	1	dsl	400	Eubanks 3500	475	3,500
RICHLAND						
Bomac Drlg	42	dsl	930	National 50-A	930	10,500
Brinkerhoff-Signal Inc	1	dsl	1100	Gardner-Denver 800	1100	13,000
	11	dsl	1500	National 80-B	1500	15,000
	74	dsl	1500	Gardner-Denver GD-800	1500	15,000
Drilcon Inc	1	dsl	1125	Bethlehem 450	1125	11,000
Helmerich & Payne Intl Drlg Co	15	dsl	1200	OILWELL 76	1200	13,500
Kenai Drlg Rocky Mountain Inc	27	dsl	1200	National CA-751	1200	14,000
Parker Drlg Co	92	dsl	1200	National 100-M	1200	15,000
Pruet-Ram-Company	2	dsl	3000	Emsco C-1	3000	20,000
	3	dsl	1800	Emsco D-2	1200	15,000
Tom Brown Inc	19	dsl	750	National CA-50	750	10,000
Transcontinental Drlg Co Inc	46	dsl	2000	National 80-B	1836	15,000
ROOSEVELT						
Atco Drlg Inc	58	dsl-elec	1800	National 80-UE	1800	15,000
Bomac Drlg	37	dsl	750	National 50-A	750	10,500
	50	dsl	1800	National 80-B	2000	16,000
Century Drlg Co	1	dsl	500	Brewster N-4-A	425	6,500
Noble Drlg Corp	E-552	dsl	1200	Emsco A-550	910	13,000
	N-810	dsl	1600	National 80-B	1000	15,000

MONTANA (Cont'd)

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
ROOSEVELT (Contd)						
Pruet-Ram-Company	4	dsl	2000	Emsco D-3	2000	18,000
	5	dsl	1800	Emsco D-2	1200	14,000
True Drlg Co	22	dsl	1200	National 55	1200	13,000
SHERIDAN						
Bomac Drlg	39	dsl	1300	Brewster N-75	1155	12,000
Cardinal Drlg Co	14	dsl	375	Emsco GB-350	375	8,500
Drilcon Inc	4	dsl	1860	National 110	1860	15,000
Helmerich & Payne Intl Drlg Co	38	dsl	1350	National 80	1350	16,000
Transcontinental Drlg Co Inc	31	dsl	1600	Wilson 90-B	1600	15,000
	50	dsl	2000	Gardner-Denver GD-800	1400	15,000
Westburne Drlg Inc	61	dsl	1000	National 55	1320	12,500
STILLWATER						
Simmons Drlg Inc	31	dsl	440	Spencer Harris 6000	440	6,000
TETON						
Simmons Drlg Inc	32	dsl	440	Spencer Harris 3500	440	5,000/3½"
	39	dsl	440	M-CSCO U-34	440	7,000
	39	dsl	440	M-CSCO U-15	440	7,000
TOOLE						
Aikins Drlg	2	dsl	200	Bycyrus	200	3,000/2⅞"
Century Drlg Co	4	dsl	480	National T-12	600	3,500
Comanche Drlg Co	4	dsl	270	Mayhew 2500-A	220	2,500
Elenburg Explor Inc	5	dsl	420	Walker-Neer CC-2000	180	2,500
WIBAUX						
Bomac Drlg	38	dsl	900	Gardner-Denver 700-M	900	11,500
YELLOWSTONE						
Century Drlg Co	3	dsl	500	National T-20	425	6,500
L & R Drlg Co	2	dsl	250	Mayhew 2000	165	2,000/3½"

NEBRASKA

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
CHEYENNE						
Exeter Drlg Northern Inc	5	dsl	300	M-CSCO U-34-D	300	6,000
DAWES						
Elenburg Explor Inc	3	dsl	420	Walker-Neer CC-2000	180	2,500
DUNDY						
Murfin Drlg Co	3	dsl	300	National T-25	300	5,000
HITCHCOCK						
Murfin Drlg Co	2	dsl	300	National T-32	300	5,000
Stoeppelwerth Drlg Inc	1	dsl	375	National T-32	375	5,500
KIMBALL						
Banner Drlg Co	3	dsl	500	National T-45	800	9,500
Exeter Drlg Northern Inc	14	dsl	375	Bethlehem C-50	460	7,500
Toltek Drlg Co	4	dsl	440	Unit U-34	440	7,000
RED WILLOW						
Murfin Drlg Co	20	dsl	525	National 370	600	7,500

NEVADA

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
CHURCHILL						
Montgomery Drlg Co	2	dsl-elec	2000	OILWELL 940-E	3000	18,000/5"
ELKO						
Montgomery Drlg Co	4	dsl	2000	OILWELL 96	1500	18,000/5"
EUREKA						
Brinkerhoff-Signal Inc	2	dsl	875	M-CSCO U-36-A	600	9,000
NYE						
Cardinal Drlg Co	2	dsl	864	Emsco 350	760	8,000/8,500
WHITE PINE						
Montgomery Drlg Co	7	dsl	1200	National 75	700	11,000/5"

NEW MEXICO

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
UNDESIGNATED						
Challenger Drlg	14-S	dsl	5500	National 125	1100	4,000/13"
Chico Drlg Co Inc	3	dsl	550	Emsco D-2	1500	14,000
BERNALILLO						
Earl & Son Drlg Inc	1	top drive	1500	Ingersoll-Rand	3800	1,500
CHAVES						
Artesia Fishing Tool Co	1	dsl	400	Mayhew 3000	200	4,000/3½"
Cactus Drlg Corp	8	dsl	850	Brewster N-7	1170	10,000
Kenai Drlg of Texas Inc	14	dsl	700	Emsco GC-500	800	11,000
W E K Drlg Co Inc	1	dsl	500	M-CSCO U-34	360	7,500
	2	dsl	600	Ideco H-35	440	10,500
Warton Drlg Co	8		900	Cabot/Franks M-750	635	7,000
EDDY						
Ard Drlg Co	2	dsl	1986	M-CSCO U-20	1800	18,000
	3	dsl	1400	M-CSCO U-40	1200	15,000
	7	dsl	1200	M-CSCO U-40	1200	14,000

NEW MEXICO (Cont'd)

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
EDDY (Contd)						
Cactus Drlg Corp	15	dsl	1200	Bethlehem 650	1200	15,000
Hondo Drlg Co	10	dsl	1250	Brewster N-75-A	1250	15,000
	3	dsl	1200	Emsco	800	13,500
	5	dsl	1200	National 55-C	800	13,500
Kenai Drlg of New Mexico Inc	23	dsl	1800	Emsco J-1250	1800	15,000
Kenai Drlg of Texas Inc	15	dsl	600	Emsco G-500	800	11,000/4"
Kenai Drlg of New Mexico Inc	22	dsl	1000	Emsco J-1100	1400	15,000
Kenai Drlg of Texas Inc	15	dsl	580	Emsco GC-500	800	11,000
Kenai Drlg West Coast Inc	23	dsl	1000	Emsco J-1250	1400	15,000
L & M Drlg Inc	1	dsl	750	3000	440	7,500
Landis Drlg Co	4	dsl	800	Brewster N-45	700	10,000
Loffland Bros Co	331	dsl	2160	M-CSCO U-1220	2400	18,000
MGF Drlg Co-Midland	23	dsl	1150	OILWELL 76	1150	13,500
	26	dsl	1725	Brewster N-95	1725	19,000
McVay Drlg Co	4	dsl	850	National 75	850	12,000
	8	gas	1200	National 80-B	1200	15,000
Moranco	3	dsl	1100	M-CSCO 712-A	1000	15,000
	7	dsl	1100	Brewster N-75	1000	15,000
Parker Drlg Co	34	gas	1200	National 75	1200	16,000
Santa Fe Drlg Co (Western)	2	gas	1850	Bethlehem B-1013	2118	21,000
Sharp Drlg Co Inc	32	dsl	1500	Emsco 800	1482	16,500
	48	dsl	1355	Bethlehem M-58	988	13,500
	62	dsl	1600	Emsco D-3	1414	16,000
	63	dsl	2000	Emsco D-3	1836	18,000
	65	dsl	2000	Emsco D-3	1836	18,000
Sterling Drlg Co	9	dsl	1350	Brewster N-75	1100	14,000
Warton Drlg Co	1	gas	1650	Brewster N-75	1650	13,000
	2	dsl	970	National 50-A	1100	11,000
	3	dsl	3300	National 110	3300	18,000
	6	gas	1700	National 80-B	1320	16,000
GRANTS						
Morrow Drlg Co	1	dsl	1360	Cabot 1287	350	4,000
HARDING						
Baker & Taylor Drlg Co	18	dsl	470	Emsco 250	470	4,500
LEA						
Ard Drlg Co	5	dsl	1986	M-CSCO U-20	1800	15,000
	6	dsl	1200	M-CSCO U-15	1200	11,500
BBL Drlg Corp	1	dsl	500	Wilson Mogul 42	760	8,000
Cactus Drlg Co	59	dsl	502	Brewster N-4	454	6,000
	64	dsl	875	Brewster N-45	670	7,500
	65	dsl	502	Brewster N-4	454	6,000
	67	dsl	502	National T-32	454	6,500
	68	dsl	375	Ideco H-30	454	6,000
	30	dsl	2000	National 110	2976	23,000
Delta Drlg Co	60	dsl-elec	1825	Emsco D-3 Type II	2600	15,000
	3	dsl	2300	Emsco C-1 Type III	2331	18,000
Hondo Drlg Co	1	dsl	950	M-CSCO U-15	700	10,500
	4	dsl	1450	Brewster N-75	1150	13,500
	6	gas	600	M-CSCO U-15	500	9,000
	7	gas	1000	Brewster N-55	750	10,500
Kenai Drlg of Texas Inc	18	dsl	410	Ideco H-35	450	6,500/4"
Kenai Drlg of New Mexico Inc	21	dsl	1000	Unit U-20	1400	15,000
Kenai Drlg of Texas Inc	18	dsl	800	Ideco H-35	580	7,000
	19	dsl	825	Emsco GA-500	800	11,000
	19	dsl	700	Emsco GA-500	800	11,000/4"
Lanois Drlg Co	2	dsl	1000	Brewster N-75	1350	13,500
MGF Drlg Co-Midland	1	dsl	750	Bethlehem M-58	750	12,500
	22	dsl	1500	OILWELL 760	1500	15,000
	25	dsl	1725	Brewster N-95	1725	19,000
McVay Drlg Co	10	gas	1300	National 100	1300	16,000
	7	dsl	1200	National 75-CA	1200	13,000
	9	dsl	1400	National 110	1400	18,000
Moranco	1	dsl	1100	OIME 1000-SL	1000	15,000
	2	dsl	1100	Emsco GB-800	1000	15,000
	9	dsl	750	Brewster N-55	750	11,000
Parker Drlg Co	38	gas	1200	National 100-M	1800	18,000
	66	gas	2400	National 130	2400	25,000
	89	gas	2000	National 1320	2000	23,000
Santa Fe Drlg Co (Western)	12	dsl-elec	2000	Emsco A-1100-E	1800	19,000
Sharp Drlg Co Inc	36	dsl	2940	Bethlehem MC-950	2742	22,000
Sterling Drlg Co	14	dsl	375	Brewster N-4	432	7,500
	4	dsl	1075	National 50-A	900	12,000
Tri-Service Drlg Co	8	gas	700	OILWELL 76	900	13,000
Warton Drlg Co	4	gas	1300	National 100	1650	16,000
	5	dsl	1270	National 50-A	1370	11,000
	7	dsl	1200	National 75	1300	13,000
Willbaos Drlg Inc	2	gas	1150	Wilson Giant	840	10,000
	7	gas	1275	Emsco A-800	1275	16,000
MC KINLEY						
Kerr-McGee Corp	16-31	dsl-elec	1000	National 100	950	2,500/3⅞"
Nicor Drlg Co	37	dsl	850	Failing Stratmaster	450	6,500
RIO ARRIBA						
Aztec Well Serv	124	dsl	600	Wilson 75	1100	10,000
	50	dsl	400	Wilson Mogul	350	6,000
	56	dsl	400	Wilson Mogul	350	6,000
	65	dsl		Wilson Mogul		4,500
	73	dsl	400	Cardwell KM-210	500	6,500
	171	dsl	600	Wilson M-75	700	
	222		750	Wilson M-75	1100	
RIO ARRIBA (Contd)						
Cactus Drlg Corp	19	gas-dsl	1070	National 50-A	984	10,000
Coleman Drlg Co	3	dsl	900	Ideco H-44-CSC	636	8,000
Young Drlg Co	4	dsl	400	Cardwell K-500	600	8,500
ROOSEVELT						
Norton Drlg Co	4	dsl	500	Wilson 75	900	10,500
Republic Drlg & Serv Inc	4	dsl-elec	1200	OILWELL 760-E	1000	14,000
WEK Drlg Co Inc	3	dsl	450	Emsco S-45-E	220	6,500
SAN JUAN						
All Western Drlg	3	dsl	840	Emsco U-15	840	10,000
Arapahoe Drlg Co	10	gas-btne	700	National 50-A	500	12,000
	11	gas-btne	300	National T-32	320	9,000
	2	gas-btne	300	National T-32	320	8,000
	3	gas-btne	300	Wilson Mogul	320	6,500
	4	gas-btne	700	National 50-A	500	12,000
	6	dsl	300	National T-32	350	8,000
Aztec Well Serv	75	dsl	360	Cardwell KM-210	400	4,500
	89	dsl		Wilson Mogul		4,500
Bayless Drlg Co	1	dsl	1500	Ideco H-1000	950	10,000
	2	dsl	350	Challenger M-280	400	8,500
	3	dsl	1500	Cooper LTO-550	550	8,500
Brinkerhoff Drlg Co Inc	32	dsl	1000	Emsco GC-350	465	8,000
Brinkerhoff-Signal Inc	79	dsl	550	National 370	800	8,500
Cactus Drlg Corp	20	dsl	850	Brewster	540	7,000
Coleman Drlg Co	1	dsl	800	Wilson Mogul	750	8,000
Four Corners Drlg Co	10	dsl	750	Cardwell Drlg Co	636	8,000
	11	dsl	750	Cardwell KB-500	636	8,000
	2	dsl	750	Cardwell KB-500	636	8,000
	3	dsl	750	Cardwell KB-500	636	8,000
	5	dsl	750	Cardwell KB-500	636	6,000
	6	dsl	750	Cardwell KB-500	636	8,000
	7	dsl	750	Cardwell KB-500	636	8,000
	8	dsl	750	Cardwell KB-500	636	8,000
	9	dsl	750	Cardwell KB-500	636	8,000
Kenai Drlg of New Mexico Inc	10	dsl	800	Emsco GA-250-T	400	6,500
	31	dsl	1200	Wilson Giant	1000	8,500
LLL Drlg Co Inc	2	dsl	860	Cabot/Franks 750	860	10,000
Lama Drlg Co Inc	4	dsl	500	M-CSCO U-34	300	9,000/3½"
Young Drlg Co	2	dsl	600	Ideco DIR-701	600	8,500
	3	dsl	400	Wilson 75	600	8,500
SANDOVAL						
Aztec Well Serv Co	184	dsl	600	Wilson M-75	1100	
Brinkerhoff Drlg Co Inc	56	dsl-elec		Emsco A-110-E		18,000
Brinkerhoff-Signal Inc	78	dsl	1600	National 610	1100	12,500

NEW YORK

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
UNDESIGNATED						
Underwater Gas Dev Ltd	2	dsl	200	Ingersoll-Rand T-5	350	40,000
	4	dsl	320	Challenger 320	320	5,000
ALLEGANY						
Falrman Drlg Co	7	dsl	350	Ideco H-44	550	8,000
CHAUTAUQUA						
Intl Petroleum Serv Co	6	dsl	475	Wilson 42	475	7,500
Underwater Gas Dev Ltd	5	dsl	250	Failing 3500	250	40,000
STEUBEN						
Falrman Drlg Co	14	dsl	400	Brewster	350	7,500
WYOMING						
Intl Petroleum Serv Co	2	dsl	275	CP-7000	375	4,000

NORTH DAKOTA

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
UNDESIGNATED						
Bird Oil Equipment Ltd	3	dsl		U-36A-T	600	8,500
GCO Drlg Co	3	dsl	820	M-CSCO U-15	650	10,000
	4	dsl	1100	National 50-A	850	11,500
ADAMS						
Bomac Drlg	52	dsl	2000	National 80-B	1800	16,000
BILLINGS						
Anderson-Myers Drlg Co	8	dsl	1600	National 80	1800	16,000
Bomac Drlg	30	dsl	1700	OILWELL 96	1500	16,000
	33	dsl	2000	OILWELL 96	1500	16,000
	41	dsl	1000	Brewster N-7	1000	10,500
	49	dsl	2000	Gardner-Denver 800	1800	16,000
Cardinal Drlg Co	1	dsl	864	Emsco 500	864	10,500
	10	dsl	1296	Emsco GB-800	1296	13,500
	7	dsl	864	Emsco 500	864	10,000
	9	dsl	880	National 50-CA	880	11,500
Nicor Drlg Co	40	dsl	800	OILWELL 600	600	11,000
Pruet-Ram-Company	1	dsl-elec	2000	Emsco D-3	2000	18,000
Tom Brown Inc	16	dsl	750	National 50-CA	750	11,000
Transcontinental Drlg Co Inc	54	dsl	800	National 50-A	980	10,000
True Drlg Co	21	dsl	1800	National 80-B	1800	15,000
	23	dsl	1800	M-CSCO U-712-A	1800	16,000
Westburne Drlg Inc	59	dsl	1100	Ideco M-750-D	800	10,000
BOTTINEAU						
Bomac Drlg	21	dsl	380	Ideco H-35	330	7,000

BESTOLIFE...

For 50 years,
the best for drill collars.
No other pipe dope can
surpass our protection
or excellent
quality control.

BESTOLIFE 270
BESTOLIFE
RSR

BESTOLIFE
CORPORATION

1111 West Mockingbird Lane/Dallas, Texas 75247
(214) 631-6070; WATS(outside Texas) 800-527-9452

*Available at your favorite oilfield supply store
in standard and arctic grades.*

Circle 307 on Reader Service Card

NORTH DAKOTA (Cont'd)

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
BOWMAN						
Cardinal Drlg Co	11	dsl	864	Emsco GA-500	864	10,500
BURKE						
Bomac Drlg	31	dsl	700	Bethlehem S-45-E	700	7,500
DIVIDE						
Bomac Drlg	27	dsl	700	Brewster N-55	920	10,000
Nicor Drlg Co	16	dsl	750	OILWELL 76	1000	15,000
Penrod Drlg Co	104		2000	National 80-B	1760	15,000
DUNN						
Brinkerhoff-Signal Inc	5	dsl	1500	National 80	1500	15,000
	81	dsl-elec	2100	OILWELL 760-E	2100	16,000
Nicor Drlg Co	27	dsl	1000	Brewster N-95	1500	16,000
Noble Drlg Corp	E-551	dsl	1200	Emsco A-550	910	13,000
Ratliff Drlg Co	6	dsl	1650	Emsco GB-800	1650	17,000
Republic Drlg & Serv Inc	1	dsl-elec	1200	OILWELL 740-E	1000	14,000
EMMONS						
Cardinal Drlg Co	5	dsl	541	Emsco 250	560	7,500/4"
GOLDEN VALLEY						
Cyclone Drlg Co	3	dsl	1250	Unit U-30	1250	15,000
Nicor Drlg Co	25	dsl	1000	National 125	1500	1,500
Penrod Drlg Co	101	dsl	1684	Brewster N-46	1080	10,000
Republic Drlg & Serv Inc	2	dsl-elec	1200	OILWELL 740-E	1000	14,000
HETTINGER						
Cliffs Drlg Co	36	dsl	700	Emsco JB-1250	1000	16,000
MCKENZIE						
Amoy Drlg & Well Serv Corp	52	dsl	1500	National 1500	1500	16,000
Anderson-Myers Drlg Co	6	gas	1650	Emsco GB-800	1600	14,000
Atco Drlg Inc	54	dsl-elec	1800	National 610-UE	1800	12,000
Bomac Drlg	34	dsl	700	Brewster N-7	700	10,500
	35	dsl	2000	National 110	2300	20,000
	46	dsl	1300	National 610	1200	11,500
	47	dsl	2000	National 80-B	1800	16,000
	48	dsl	2000	Gardner-Denver 800	1800	16,000
	51	dsl	2600	National	2400	20,000
	54	dsl	1300	National 610	1200	11,500
	55	dsl	2000	Gardner-Denver 800	1800	16,000
Brinkerhoff Drlg Co Inc	17	dsl	1560	National 80-B	1560	14,000
NORTH DAKOTA (Cont'd)						
MCKENZIE (Contd)						
Brinkerhoff Drlg Co Inc	21	dsl	1040	Emsco GC-500	1040	11,500
Burris Drlg Co	101	dsl	1500	Gardner-Denver 1100-M	1000	18,000
	102	dsl	1000	Gardner-Denver 700	700	14,000
	103	dsl	1000	Gardner-Denver 700	700	14,000
Cliffs Drlg Co	6	dsl	800	National 610	800	12,500
Drilcon Inc	2	dsl	1176	National 80-B	1176	14,500
Dual Drlg Co	17	dsl	1650	Bethlehem M-58	1100	12,500
	3	dsl	1500	Wilson 120	1650	15,000
	4	dsl	1900	National 110	1500	19,000
Enopco	3	dsl	1620	National 80-B	1620	17,500
Forwest inc	2	dsl-elec	2600	Ideco E-2100	1800	22,000
	3	dsl-elec	2000	Ideco 1[illegible]00-E	1800	15,000
	4	dsl-elec	2000	Ideco 1200	1800	15,000
Kenai Drlg Rocky Mountain Inc	1	dsl	2200	Emsco A-800	2450	15,000
Nicor Drlg Co	41	dsl	1000	Gardner-Denver 1100-M	1500	18,000
Noble Drlg Corp	N-82	dsl	1550	National 80	1000	15,000
	N-84	dsl	1600	National 80-B	1000	15,000
	N-88	dsl	1600	National 80-B	1000	15,000
	814	dsl	2000	National 80-B	1554	15,000
Penrod Drlg Co	105	dsl	1575	National 80-B	1760	15,000
Republic Drlg & Serv Inc	3	dsl-elec	1200	OILWELL 740-E	1000	14,000
Tom Brown Inc	22	dsl	750	National 50-CA	750	12,000
	23	dsl	1100	National 75-CA	1100	14,000
Transcontinental Drlg Co Inc	38	dsl	1750	Gardner-Denver GD-800	1836	15,000
	39	dsl		Gardner-Denver GD-800	1224	13,500
MCLEAN						
Brinkerhoff-Signal Inc	77	dsl	1500	Gardner-Denver 800-M	1500	13,500
MORTON						
Ratliff Drlg Co	15	dsl	1650	National 80-B	1650	18,000
MOUNTRAIL						
Bomac Drlg	26	dsl	950	M-CSCO U-15	920	9,500

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
NORTH DAKOTA (Cont'd)						
RENVILLE						
Bomac Drlg	40	dsl	1000	OILWELL 76	1000	12,000
Cardinal Drlg Co	12	dsl	400	National T-20	400	6,000/3½"
	3	dsl	400	Emsco GB-160	400	4,500/3½"
	6	dsl	560	Emsco 250	440	6,000/4"
	8	dsl	560	National T-20	400	5,000/4"
RICHLAND						
Drilcon Inc	5	dsl	1200	Ideco H-725	1000	11,500
Transcontinental Drlg Co Inc	51	dsl	1070	OILWELL 76	1224	12,500
SLOPE						
Bomac Drlg	45	dsl	2000	Gardner-Denver GD-800	1800	16,000
Noble Drlg Corp	N-811	dsl	1420	National 80-B	1420	15,000
Westburne Drlg Inc	62	dsl	1050	National 50-A	1200	11,000
UNDESIGNATED						
Nicor Drlg Co	30	dsl	1000	M-CSCO U-914-C	1400	18,000
WILLIAMS						
Anderson-Myers Drlg Co	16	dsl	2300	National 55	1200	18,000
	5	dsl	1000	Emsco GB-500	820	10,000
Bomac Drlg	36	dsl	1435	National 80	1435	14,000
	53	dsl	2000	National 80-B	1800	16,000
Brinkerhoff-Signal Inc	10	dsl	1000	M-CSCO U-40	1000	13,000
Cliffs Drlg Co	14	dsl	600	Emsco MJ-1250	600	15,000
Kenai Drlg Rocky Mountain Inc	12	dsl	1000	National 50-A	950	10,000
	26	dsl	1200	Wilson Atlas	1200	14,000
Kissinger Petroleum Corp	5	dsl	2000	OIME 1500-SL	1500	15,000
Nicor Drlg Co	17	dsl	700	OILWELL 76	1000	15,000
Noble Drlg Corp	OW-861	dsl	2400	OILWELL 860	2400	18,000
Penrod Drlg Co	103	dsl	1760	National 80-B	2000	20,000
Universal Drlg Co	2	dsl-elec	1000	Wilson 90-E	1300	13,000
Westburne Drlg Inc	53	dsl	750	National Ideal 55	950	12,000
WILLISTON						
Helmerich & Payne Intl Drlg Co	88	dsl-elec	1700	OILWELL 860	1000	16,000
OHIO						
UNDESIGNATED						
Mutual of America Inc	2	dsl	145	Mayhew 3000	280	3,000
	4	dsl	220	Waleneer R-2	280	5,000
ASHTABULA						
P & P Drlg	6	dsl	470	Ideco H-35-S	470	6,500
	2	dsl	470	Ideco H-35-S	470	6,500
	5	dsl	550	Gardner-Denver 500-M	500	7,000
COLUMBIANA						
Armstrong Drlg Inc	27	dsl		Wilson Mogul 42	280	7,500
HOLMES						
Midwest Drlg Ltd	7	dsl	425	Ideco H-35	425	5,000
MEDINA						
Armstrong Drlg Inc	10	dsl	380	Mayhew 3000 Port	350	4,000
PORTAGE						
P & P Drlg Co	3	dsl	470	National T-45	470	7,500
	4	dsl	470	Brewster N-35	470	7,000
	7	dsl	470	Emsco WS-1	470	7,500
STARK						
P & P Drlg	1	dsl	470	Emsco WS-1	470	7,500
TRUMBULL						
Armstrong Drlg Inc	11	dsl	380	Cabot/Franks	380	7,500
	12	dsl	380	Mayhew 3000	318	4,000
Midwest Drlg Ltd	11	dsl	550	Cooper LTD-550	550	8,500
	111	dsl	425	Cooper LTD-350	425	7,500
WASHINGTON						
Apache Drlg Inc	1	dsl	300	Failing 2500	260	3,500
Cherokee Drlg & Oper Inc	1	dsl	300	Speedstar	320	3,500
	2	dsl	300	Failing 2500	280	3,000
Comanche Drlg Inc	1	dsl	300	Speedstar SS-40	320	3,500
FWA Drlg Co Inc	22	dsl	350	Wilson Super 38	350	4,500
Shawnee Drlg Co Inc	1	dsl	300	Speedstar SS-40	260	3,500
WAYNE						
Midwest Drlg Ltd	77	dsl	425	Ideco H-35	425	5,000
OKLAHOMA						
UNDESIGNATED						
Jernigan Drlg Co	3	dsl	1000	Gardner-Denver 800	1000	18,000
Pool Well Serv Co	27	dsl		Cabot 500	500	5,500
	50	dsl	379	Cabot 500	500	5,500
Robinson Bros Drlg Co	10	dsl		Brewster N-45	3406	12,400
	2	dsl	600	OILWELL 66	1000	11,500
	4	dsl	1000	National 50	800	10,000
	5	dsl	1000	OILWELL 66	900	11,000
	Gary Jack	dsl-elec	2700	Gardner-Denver	2000	22,000
ALFALFA						
Lohmann-Johnson Drlg Co Inc	8	dsl	300	National 32	550	7,500
OKLAHOMA (Cont'd)						
ALFALFA (Contd)						
Top Drlg Co Inc	6	dsl	350	National T-32	350	7,500
ATOKA						
Arden Drlg Co	4	dsl	1800	Continental Emsco D-2	1000	16,000
BEAVER						
Damac Drlg Inc	3	dsl	700	Wilson Mogul	700	9,500
Eagle Drlg Inc	2	dsl	1000	National T-45	725	9,500
Gabbert-Jones Inc	3	dsl	550	Emsco 350	550	7,000
Lohmann-Johnson Drlg Co Inc	18	dsl	300	M-CSCO Unit 15 S/N 239	400	6,000
Nicor Drlg Co	12	dsl	950	Gardner-Denver 700-M	950	13,000
	2	dsl	1100	M-CSCO U-15	1100	12,000
	28	dsl	600	Unit U-15	700	12,500
Rains & Williamson Oil Co Inc	5	dsl	360	Ideco H-40	400	7,000
Service Drlg Co	9	dsl	500	M-CSCO U-15	800	9,200
Unit Drlg & Expl Co	18	dsl	1000	Gardner-Denver 500	1300	15,000
	1	dsl	500	Unit U-15	800	10,000
	15	dsl	1300	M-CSCO 914-C	1850	20,000
Zenith Drlg Corp Inc	3	dsl	800	Brewster N-75	800	10,000
	6	dsl	600	Emsco GB-350	600	8,500
	8	dsl	600	Emsco GB-350	600	8,500
BECKHAM						
Big Chief Drlg Co	45	dsl	1500	Brewster N-95-A	2250	18,000
Helmerich & Payne Intl Drlg Co	44	dsl	2160	OILWELL 96	2160	22,000
	78	scr	2000	National 11-OUE	1500	20,000
Loffland Bros Co	34	dsl-elec	3500	M-CSCO U-1220	2500	25,000
	104	dsl-elec	3300	Emsco 3000	3300	35,000
	102	dsl-elec	3300	M-CSCO U-1220-EBD	3300	30,000
Moran Drlg Corp	36	dsl	2300	Brewster N-12	2500	20,000
Noble Drlg Corp	N-115	dsl	2400	National 110	1375	20,000
	N-83	dsl	1600	National 80-B	1000	15,000
Parker Drlg Co	167	dsl	1650	OIME SL-1500	1650	20,000
	170	dsl	1650	OIME SL-1500-P	1650	20,000
	181	dsl	3000	OIME Hercules 3000-E	3000	30,000
	43	gas	2000	OILWELL 96	2000	23,000
	54	gas	2000	National 130	2000	25,000
Rowan Drlg U S	9	dsl-elec	2600	National 1625-DE	2000	25,000
	31	dsl	3200	National 1625	3300	30,000
Sharp Drlg Co Inc	40	dsl	2150	OILWELL 96	2115	18,000
TRG Drlg Corp	10	dsl	3000	Gardner-Denver 3000-E	3000	30,000
	18	dsl-elec	2200	Gardner-Denver 1500-E	2400	22,000
	19	dsl-elec		Gardner-Denver	2400	22,000
Tri-Land Drlg Co	1	dsl	1500	Gardner-Denver 1500-E	1500	21,000
Trigg Drlg Co Inc	3	dsl	1200	National 100	1600	14,000
U R C Drlg Corp	4	dsl-elec	1500	M-CSCO 914-C	1500	22,000
Unit Drlg & Expl Co	7	dsl	500	Unit U-15	960	10,000
BLAINE						
Austin Drlg Co		dsl	900	M-CSCO U-36-57	1000	12,000
Barrett Drlg Co	10	gas	600	National 75		12,000
Drillers Inc	25	dsl	1000	Brewster N-75	1000	14,000
Eagle Drlg Inc	3	dsl	1100	BDW-800	1500	14,000
FWA Drlg Co Inc	10	dsl	1000	Wilson Giant	800	10,750
Harper-Turner Drlg	2	dsl	800	National 50	820	10,500
URC Drlg Corp	1	dsl	860	National 50	860	10,000
Viersen & Cochran Drlg Co	1	dsl	800	OILWELL 660	800	12,000
BRYAN						
Sloan Drlg Co	16	dsl	400	Wilson 42	600	7,000
CADDO						
Austin-Dunham Inc		dsl	850	Brewster N-75	850	15,000
		gas	1000	Brewster 75	1000	15,000
Big Chief Drlg Co	11	gas	1350	Brewster N-75	1350	13,000
Harper-Turner Drlg Co	11	dsl	2000	National 110	1500	20,000
Helmerich & Payne Intl Drlg Co	8	dsl	950	National 55	950	15,000
Honeymon Drlg Co Ltd	4	dsl	1500	OIME S/L 1500	1500	18,000
ITT Eason Oil Co	12	dsl	2000	National 80-B	1200	16,000
	17	dsl	2600	Emsco C-1	2000	21,000
Mercury Drlg Co	10	dsl	1000	Gardner-Denver 800	2000	18,000
	7	dsl	1000	Gardner-Denver 800-M	2000	18,000
	1	dsl	1000	Emsco 800	1470	16,500
	6	dsl	750	Emsco 500	1470	14,000
Moran Drlg Corp	31	dsl	2900	Ideco 2500-Elec	2500	25,000
Nicor Drlg Co	1	dsl	1500	M-CSCO U-20	1500	15,000
	11	dsl	1100	M-CSCO U-1220-B	2805	21,000
	15	dsl	1350	OILWELL 76	1350	16,000
	31	dsl-elec	1000	M-CSCO U-914-EC	1400	18,000
	4	dsl	1200	Gardner-Denver 800-M	1200	15,000
	6	dsl	1200	National 55	1200	14,500

OKLAHOMA (Cont'd)

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
CADDO (Contd)						
Nicor Drlg Co	9	dsl	1800	OIME 1500	2070	18,000
T R G Drlg Corp	11	dsl-elec	2000	Gardner-Denver 1100	2400	18,000
	12	dsl-elec	1500	Gardner-Denver 800	1800	15,000
	23	dsl	1400	National 80-B	1305	14,500
Unit Drlg & Expl Co	3	dsl	500	National 50-A	960	10,000
CANADIAN						
Basin Drlg Corp	5	dsl	600	National CA-75	850	11,000
	6	dsl	650	Brewster N-7	850	9,500
	8	dsl	600	Gardner-Denver 500	850	12,500
Big Chief Drlg Co	24	gas	1200	M-CSCO U-15	900	11,000
	36	gas	1400	National 55	900	11,000
	41	gas	1400	Brewster 75	900	12,000
Bonray Drlg Corp	21	dsl	990	Ideco H-750	660	12,000
	22	dsl	800	Ideco H-525	800	9,500
	4	gas	900	Unit U-40	900	14,000
Cactus Drlg Corp	6	dsl	1070	Ideco 7-11 *	1400	14,000
Drillers Inc	26	dsl	700	Emsco GB-500	700	10,000
	30	dsl	750	Unit U-15-M	850	11,000
FWA Drlg Co Inc	5	dsl	1000	Wilson Giant	800	11,000
	9	dsl	1000	Wilson Giant	800	10,750
Honeymon Drlg Co Ltd	1	dsl	800	National 50-A	800	12,000
Jernigan Drlg Co	2	dsl	650	National 50-A	1000	14,000
Mercury Drlg Co	2	dsl	750	Emsco Unit U-15	940	12,000
Nicor Drlg Co	19	dsl	650	Ideco 750	850	14,000
	5	dsl	800	Bethlehem C-50	800	10,000
	7	dsl	800	M-CSCO U-15	800	11,500
Noble Drlg Corp	E-554	dsl	1450	Emsco A-550	1000	13,000
Schlensker Drlg Corp	2	gas	700	Bethlehem MC-450	900	12,000
Smart Drlg Co	2	dsl-elec	677	M-CSCO Unit 36	1000	14,000
	6	dsl	700	National 50	950	11,000
T R G Drlg Corp	2	dsl	825	Unit U-15	870	10,000
Thomas Drlg Co	9	dsl	640	Brewster N-46	640	12,000
Trigg Drlg Co Inc	4	dsl	700	National 75	950	12,000
	5	gas-btne	500	National 50-A	800	10,000
Viersen & Cochran Drlg Co	12	gas	500	National 50	800	9,000
Warren Interstate Drlg Co	1	dsl	1000	Cabot 2042-TDHT	700	10,700
CARTER						
Ardmore Drlg Co	1	dsl	450	Ideco H-30-D	450	5,000
	3	gas	1350	Ideco M-10000	1350	12,500
Big Chief Drlg Co	12	gas	1600	National 80-B	1600	14,000
Bodard & Hale Drlg Co	8	dsl	1100	National 50	1100	10,500
Dual Drlg Co	8	dsl	1500	Wilson 75	750	9,500
E W Moran Drlg Co Inc	1	dsl	900	Wilson Giant	800	12,000
	12	dsl	950	Bethlehem S-60	700	10,000
Jones Drlg Corp	2	dsl	385	Wilson Super 38	385	5,000
Pilgrim Drlg Co	1	dsl	750	Ideco H-35	600	8,000
Schlensker Drlg Corp	8	dsl	635	Wilson Mogul 42	475	7,000
T R G Drlg Corp	15	dsl	1000	Wilson Super Atlas	1305	14,000
Thomas Drlg Co	6	gas	500	National 50-A	600	10,500
Top Drlg Inc	2	dsl	1200	OILWELL 660	1200	14,000
CIMARRON						
Service Drlg Co	3	dsl	320	M-CSCO U-34	450	6,500
CLEVELAND						
Frio Drlg & Prod Co	3	dsl	600	Brewster N-55	900	10,500
Johnson-Bates Drlg Co Inc	3	dsl	1100	M-CSCO U-34	1100	10,500
	7	dsl	1000	Wilson Titan	1350	12,000
Project 5 Drlg Co Inc	1	dsl	220	Gardner-Denver	220	1,900
COMANCHE						
E W Moran Drlg Co	22	dsl-elec	3000	Emsco	3200	30,000
Nicor Drlg Co	29	dsl	1500	Gardner-Denver E-1500	2000	25,000
Parker Drlg	193	dsl	4000	OIME 3000-E	4000	30,000
	114	dsl-elec	2700	Ideco 3000-E	2700	30,000
	172	dsl	1650	OIME SL-1500-P	1650	20,000
	186	dsl	2000	OIME 1500	2000	22,000
Ratliff Drlg Co	1	dsl	2640	OILWELL 96	2640	24,000
CREEK						
E E Whitehead Drlg Contrs	1	gas	425	Wilson Model 30	400	4,000
McLennan Drlg Co	4	dsl	318	Gardner-Denver	238	2,000/3½"
Quintex Drlg Co Inc	4	dsl	445	Eubanks Speedstar Double Drum	250	3,000
CUSTER						
Barrett Drlg Co	9	dsl	2400	Gardner-Denver 700	1000	15,000
	7	dsl	1000	Gardner-Denver 800	1000	18,000
Bonray Drlg Corp	1	dsl	1230	Emsco J-1000	1230	16,000
	20	dsl	1680	Ideco Super 711	1680	17,000
Cliffs Drlg Co	40	dsl	1300	National 1320-UE	1300	
E W Moran Drlg Co Inc	5	dsl	1850	Wilson 120	1100	18,000
FWA Drlg Co Inc	19	dsl	1200	Wilson Titan	1050	13,500
	7	dsl	1200	Wilson Titan	900	13,500
Harper-Turner Drlg	1	dsl	800	National 55	1000	12,000
Hickman Drlg Co	6	dsl	1450	BDW-800	1100	14,000
Loffland Bros Co	306	gas	1150	Brewster N-95	1300	17,000
	317	dsl	2250	Gardner-Denver 2100	2500	24,000
OKLAHOMA (Cont'd)						
CUSTER (Contd)						
Loffland Bros Co	327	dsl	2250	Gardner-Denver 1500	2500	24,000
	73	dsl-elec	2160	M-CSCO U-712-A	2200	18,000
Mercury Drlg Co	5	dsl	1350	Gardner-Denver 1100	2775	22,000
Moran Drlg Corp	35	dsl-elec	1800	OILWELL 76	1200	15,000
Noble Drlg Corp	GD-2	dsl	2600	Gardner-Denver 2100	2500	25,000
	N-85	dsl	1700	National 80-B	1000	18,000
	N-87	dsl	2000	National 80-B	1000	15,000
Parker Drlg Co	120	dsl	1600	Ideco 1700-M	1600	20,000
	182	dsl	3000	OIME Hercules 3000-E	3000	30,000
Pilgrim Drlg Co	2	dsl	1300	OILWELL 76	1000	16,000
Ratliff Drlg Co	8	gas-btne	1020	National 50-A	1020	10,000
T R G Drlg Corp	17	dsl-elec	2200	Gardner-Denver 1500-E	2400	22,000
Triad Drlg Corp	6	dsl	1600	Brewster N-95-A	1600	16,000
Trigg Drlg Co Inc	2	gas-btne	700	National 75	900	12,000
Viersen & Cochran Drlg Co	16	dsl	3200	National 1320-UE	3417	25,000
DEWEY						
Hickman Drlg Co	3	dsl	1200	Emsco GB-500	800	12,000
Jimmie Austin & Sons Inc		dsl	900	M-CSCO U-36	900	12,000
Mercury Drlg	4	dsl	750	Emsco Unit U-15	980	12,000
Moran Drlg Corp	33	dsl-elec	2300	National 110	2000	20,000
Rine Drlg Co	3	dsl	750	Brewster N-55	750	9,500
	4	gas	750	Brewster N-75	750	12,000
	5	dsl	1000	Gardner-Denver GD-700	1000	12,000
	7	dsl	750	Gardner-Denver 700	750	13,500
	9	dsl	1000	Gardner-Denver 800	1000	13,500
Smart Drlg Co	5	dsl	600	National 50-CA	950	11,000
Top Drlg Inc	1	dsl	650	Brewster N-7	650	10,000
	5	dsl	1000	M-CSCO U-15	1000	104/½"
Trend Drlg Co	3	dsl	1000	National 75	1200	12
	4	dsl	900	M-CSCO Unit U-36-A	900	13,000
Triad Drlg Corp	3	dsl	900	Brewster N-55	900	12,000
Unit Drlg & Expl Co	11	dsl	1000	Gardner-Denver 700	1300	14,000
Viersen & Cochran Drlg Co	2	dsl	600	National 55	800	12,000
ELLIS						
Austin Drlg Co		gas	700	Brewster N-75	900	14,000
Nicor Drlg Co	14	dsl	950	Gardner-Denver M-500	950	11,000
Penrod Drlg Co	26	dsl	2600	Emsco C-2	1950	25,000
Pulliam Drlg Co	11	dsl	2400	National 80-B	1600	15,000
	12	dsl	1800	National 50-A	1200	11,000
Smart Drlg Co	4	dsl	1000	OILWELL 76	1400	16,000
Triad Drlg Corp	5	dsl	1100	Ideco Super 750	1100	14,000
Unit Drlg & Expl Co	19	dsl	700	Gardner-Denver	960	12,000
	2	dsl	700	Unit U-15	960	11,000
Viersen & Cochran Drlg Co	17	dsl	600	OILWELL 660	830	12,000
	4	dsl	600	National 55	800	12,000
GARFIELD						
Astro Drlg Co	17	dsl	800	Cabot 750	700	11,000
Basin Drlg Corp	10	dsl	600	M-CSCO U-15	850	10,000
	7	dsl	650	Brewster N-45	850	8,500
C & R Drlg Corp	1	dsl	425	Brewster N-4	400	5,500
Cyclone Drlg & Workover Inc	12	dsl	800	Unit U-34		600
Hughes Drlg Co	2	dsl	450	Ideco H-35	450	7,600
	4	dsl	600	Ideco DIR-7015	600	8,500
L & K Drlg Co	40	dsl	900	Emsco 350	900	9,000
Nicor Drlg Co	18	dsl	595	Unit U-15	700	12,500
Sabre Drlg Div TRG Drlg Corp	7	dsl	600	M-CSCO U-15	450	7,500
	8	dsl	1050	M-CSCO U-15	1050	9,000
Trend Drlg Co	2	dsl	500	Ideco H-35	500	7,500
GARVIN						
Astro Drlg Co	20	dsl	550	Franks 550	456	8,500
Bodard & Hale Drlg Co	10	dsl	450	OILWELL 52-T	600	9,000
	7	dsl	400	Bethlehem S-55	600	8,000
	9	dsl	550	Bethlehem S-55	700	9,000
Bonray Drlg Corp	5	gas	700	National 50-A	700	9,000
E W Moran Drlg Co	20	dsl	850	Spencer 7000	550	8,000
Jerry Scott Drlg Co Inc	4	dsl	600	Bethlehem C-50	640	10,000
Jones Drlg Corp	15	dsl	1000	Brewster N-75-A	1000	14,000
Ratliff Drlg Co	2	gas	1020	National 55	1020	14,000
	7	gas-btne	1020	National 75-CB	1020	15,000
GRADY						
Arden Drlg Co	5	dsl-elec	2400	Emsco D-3	2000	18,000
Astro Drlg Co	15	dsl	912	Super Wilson GI	912	10,500
	24	dsl	825	Brewster N-55	825	12,500
Big Chief Drlg Co	43	dsl	2000	National 80-B	2250	16,000
	22	gas	1600	National 80-B	1700	14,000
	35	gas	2610	National 110	2610	20,000

OKLAHOMA (Cont'd)

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
GRADY (Contd)						
Big Chief Drlg Co	44	dsl	2400	Brewster N-95	2400	20,000
Cactus Drlg Corp	32	dsl	1600	National 100	2100	20,000
FWA Drlg Co Inc	6	dsl	1000	Wilson Giant	800	9,500
Harper-Turner Drlg Co	10	dsl	2000	National 80-B	1500	16,000
Helmerich & Payne Intl Drlg Co	84	scr	1100	OILWELL 760-E	850	
Honeymon Drlg Co Ltd	3	dsl	1100	OIME S/L 1000	1100	14,000
Loffland Bros Co	111	dsl-elec	3300	Emsco A-1500	2200	24,000
	206	gas-elec	2160	M-CSCO U-914-B	2200	20,000
	99	gas	1300	M-CSCO U-20	1645	15,000
Magic Circle Drlg Co	12	dsl	900	National 50-A	900	12,000
Mercury Drlg Co	8	dsl	1000	Gardner-Denver M-700	1100	16,000
Nicor Drlg Co	10	dsl	1000	M-CSCO U-914-C	1725	18,000
	34	dsl-elec	1000	M-CSCO U-914-EC	1400	18,000
	34	dsl-elec	1300	M-CSCO U-914-EC	1400	18,000
Noble Drlg Corp	N-114	dsl	1900	National 110	1375	20,000
Parker Drlg Co	179	dsl	3000	OIME Hercules 3000-E	3000	30,000
Project 5 Drlg Co Inc	8	dsl	220	Emsco G-42	450	10,000
Smart Drlg Co	1	dsl-mech	500	M-CSCO Unit U-15	950	13,000
	10	dsl	1000	M-CSCO U-20	1500	18,000
	9	dsl	1000	M-CSCO U-15	950	13,000
Unit Drlg & Expl Co	17	dsl	700	Gardner-Denver 700	1300	14,000
Viersen & Cochran Drlg Co	10	dsl	2000	National 100	1040	17,000
	15	dsl	1010	OILWELL 660	830	13,000
	3	dsl	800	National 75-CA	800	14,000
Warrior Drlg Co	1	dsl	568	Emsco 350-GA	700	9,000
GRANT						
C & R Drlg Corp	4	dsl	550	Wilson 42	400	6,500
HARPER						
Driller Inc	23	dsl	600	Unit U-15	600	10,000
Rine Drlg	10	dsl	550	Brewster		9,500
Sage Drlg Co Inc	3	dsl	400	Ideco H-40	400	8,500
Triad Drlg Corp	1	dsl	340	National T-32	340	7,500
Unit Drlg & Expl Co	4	dsl	500	Unit U-15	960	10,000
HASKELL						
Miller Drlg Co	108	gas	450	M-CSCO U-15	450	8,000
HEMPHILL						
Drillers Inc	36	dsl	600	Emsco G8-350	750	9,000
HUGHES						
Jerry Scott Drlg Co Inc	2	dsl	420	Unit U-34	430	6,500
Project 5 Drlg Co Inc	4	dsl	300	Brewster N-3	300	4,000
	6	dsl	350	Franks 147-A	350	4,500
	7	dsl	365	Challenger 3-T	3000	4,000
R W I T Drlg Co Inc	8	gas-LPG	345	M-CSCO U-34	280	6,000
Sloan Drlg Co	12	dsl	370	Brewster N-4	475	6,500
JACKSON						
Jack E Bearden Drlg Co	2	dsl	1500	Wilson Giant Roadair	700	9,000
KAY						
C & R Drlg Corp	3	dsl		M-CSCO U-15	450	7,500
Kay Expl Co	3	dsl	480	Failing 2500	480	3,500
KINGFISHER						
A & P Drlg Co Inc	1	gas	775	Emsco 450	225	9,000
	2	gas	825	Emsco 500	275	9,000
Astro Drlg Co	16	dsl	920	National 50-A	920	11,000
Austin Drlg Co		gas	600	M-CSCO U-36	700	11
Barrett Drlg Co	2	gas	600	National 50	600	9,000
	6	dsl	700	M-CSCO U-15	650	9,000
Basin Drlg Corp	1	dsl	650	Emsco G8-500	850	9,500
	3	dsl	650	M-CSCO U-15	850	9,500
	9	dsl	600	M-CSCO U-15	850	10,000
	2	dsl	650	National 50-A	850	9,500
BF & B Drlg Inc	1	dsl	600	Unit U-15	600	10,000
Cactus Drlg Corp	33	dsl	1050	National 100	1650	16,000
Drillers Inc	27	dsl	700	Emsco G8-500	750	10,000
Harper-Turner Drlg	4	dsl	600	National 50	820	9,000
Hughes Drlg Co	3	dsl	600	Emsco G8-350	600	8,500
	7	dsl	500	Ideco BIR-550	500	7,500
Logan Drlg Co Inc	3	dsl	900	Gardner-Denver 500	900	10,000
Magic Circle Drlg Corp	11	dsl	900	National 50-A	900	10,000
	7	dsl	320	Cabot 750	700	9,500
Ratliff Drlg Co	11	dsl	850	Brewster N-7	850	10,000
Sage Drlg Co Inc	4	dsl	800	M-CSCO U-15	800	9,500
Smart Drlg Co	3	dsl	500	M-CSCO Unit U-15-A	1000	13,000
Trend Drlg Co	5	dsl	900	M-CSCO Unit U-15-CA	900	11
U R C Drlg Corp	2	dsl	1100	National 100	1100	15,000
	3	dsl	860	Emsco 500	860	10,500
LATIMER						
Dual Drlg Co	26		18000	Wilson 150-A	1650	16,000
	18	dsl	1850	Bethlehem M-810	1100	15,000
	20	dsl	2800	OILWELL 860	1400	22,000
Jimmie Austin & Sons Inc		dsl	900	Brewster N-75	900	14,000
Miller Drlg Co	106	gas	900	National 75	900	13,500

API oil field roller chains

Heart and spine of the drive
the Sedis pin,
because STEEL is
also our specialty

sedis

A PEUGEOT STEELS AFFILIATE

102, rue Danton - 92306 Levallois-Perret - France - Tél. : (1) 758.13.93 - Tlx : 620008

Circle 309 on Reader Service Card

Bazaine Publicité

OKLAHOMA (Cont'd)

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
LATIMER (Contd)						
Miller Drlg Co	110	dsl	1500	OIME SL-1500	1500	20,000
LE FLORE						
Dual Drlg Co	10	dsl	1500	Wilson 120	1100	15,000
	14	dsl	2100	Wilson Giant	900	12,000
Unit Drlg & Expl Co	14	dsl	1000	Gardner-Denver 700	800	14,000
LINCOLN						
Bodard & Hale Drlg Co	6	dsl	550	National T-20	450	6,500
Cyclone Drlg & Workover Inc	11	dsl	1342	Unit U-34	400	600
Frio Drlg & Prod Co	1	dsl	350	Emsco 350	550	8,500
Johnson-Bates Drlg Co Inc	1	gas	350	M-CSCO U-34	300	5,700
Project 5 Drlg Co Inc	2	dsl	450	Brewster N-3		5,500
	5		450	American 250-BDW	4?0	6,000
	9	dsl	300	American 250	450	6,000
Sabre Drlg Div TRG Drlg Corp	6	dsl	450	National T-20	335	6,000
Sloan Drlg Co	18	dsl	450	Wilson 42	450	7,000
LOGAN						
Bodard & Hale Drlg Co	5	dsl	400	M-CSCO U-34	400	6,500
Bonray Energy Corp	7	dsl	476	Cooper 66	318	6,000
Frio Drlg & Prod Co	2	dsl	350	Wilson Mogul 42	550	7,000
	4	dsl	1100	National N-55	1100	11,500
Gene Porter Drlg Co	1	dsl	600	M-CSCO U-34	435	6,000
Hughes Drlg Co	5	dsl	400	Ideco BIR-3084	300	6,200
	6	dsl	450	Ideco BIR-3084	300	6,200
Johnson-Bates Drlg Co Inc	2	gas	325	M-CSCO U-34	245	6,500
	4	dsl	400	M-CSCO U-34	375	6,500
Project 5 Drlg Co Inc	3	dsl	450	Unit U-34	450	6,500
Sabre Drlg Div TRG Drlg Corp	9	dsl	450	M-CSCO U-34	450	6,000
Sumpter & Barker Drlg Co Inc	1	dsl	930	Wilson Mogul 42 Trailer Mounted	430	6,500
Venture Drlg Co	2	dsl	400	Cabot/Franks 750	700	6,500
LOVE						
Ardmore Drlg Co	2	gas	700	Wilson Giant	700	9,000
Big Chief Drlg Co	42	dsl	1800	National 80	1800	15,000
E W Moran Drlg Co Inc	15	dsl	900	Bethlehem S-55	750	10,000
	8	dsl	1600	Wilson 150	1000	15,000
Jones Drlg Corp	14	dsl	1000	Gardner-Denver	1000	13,000
	7	gas	750	Brewster N-75	750	12,000
	8	gas	700	National 55	700	12,000
	9	gas	750	C-Emsco A-550	750	12,000
Ratliff Drlg Co	9	gas	700	National 50-A	1020	11,000
Schlensker Drlg Corp	1	gas	700	National 75-CA	1050	14,000
	10	gas	900	Gardner-Denver 800-M	1350	16,000
	9	dsl	1500	OIME 1500-SL	2205	18,000
MAJOR						
Austin-Dunham Inc		gas	350	National 50	600	12,000
Big Chief Drlg Co	9	dsl	500	Ideco H-35-G	700	10,000
Bonray Drlg Corp	6	gas	700	National 50-A	700	9,000
FWA Drlg Co Inc	21	dsl	1000	Wilson Mogul 42	800	9,500
Hughes Drlg Co	1	dsl	450	Ideco H-35	450	7,400
Ratliff Drlg Co	16	dsl	750	Unit U-15	750	10,000
Thomas Drlg Co	4	dsl	500	Emsco 500	500	10,000
	5	dsl	300	Wilson Giant	300	7,500
Trend Drlg Co	6	dsl	1100	Ideco 725	1100	12,000
	7	dsl	550	Ideco H-44	608	8,500
	1	dsl	500	M-CSCO Unit U-15-A	700	10
Viersen & Cochran Drlg Co	5	dsl	600	OILWELL 660	800	12,000
MARSHALL						
E W Moran Drlg Co Inc	17	dsl	2600	Wilson 250	1500	20,000
Kingery Drlg Co Inc	10	gas	300	Wilson Giant	300	5,000
Nicor Drlg Co	3	dsl	700	M-CSCO U-15	700	11,500
T R G Drlg Corp	14	dsl-elec	2000	Gardner	2400	18,000
Viersen & Cochran Drlg Co	18	dsl	1000	National		
MC CLAIN						
Big Chief Drlg Co	20	gas	1200	M-CSCO U-40	960	13,500
Jerry Scott Drlg Co Inc	6	dsl	1342	Emsco Unit MU-15	1342	10,500
Jimmie Austin & Sons Inc		dsl	900	Emsco 450	900	12,000
Johnson & Bates Drlg Co	5	dsl	1000	M-CSCO U-15	1100	10,000
MC INTOSH						
R W I T DRLG CO INC	2	gas-LPG	345	M-CSCO U-34	280	6,000
MURRAY						
T R G Drlg Corp	16	dsl-elec	1500	Gardner-Denver	1800	15,000
NOBLE						
Cyclone Drlg & Workover Inc	9	dsl	800	Unit U-34	400	6,000
NOWATA						
Turner-Winter & Expl Co	1	dsl	900	Jaswell J-2400	900	2,400
Hughes Drlg Co	8	dsl	400	Ideco H-35	375	6,200
Kay Drlg Co	1	dsl	480	Brewster N-4	480	6,000
Northeast Drlg Co Inc	1	dsl	400	Ideco BIR-3084	300	6,200

OKLAHOMA (Cont'd)

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
OCHILTREE						
Service Drlg Co	4	dsl	500	M-CSCO U-15	800	9,200
OKLAHOMA						
Bodard & Hale Drlg Co	14	dsl	400	Brewster N-4	450	7,000
Brinkerhoff-Signal Inc	80	dsl	1500	National 80-B	1500	16,000
Cactus Drlg Co	57	dsl	550	Ideco H-35	450	6,500
Compadre Oil Corp	1	dsl	300	Walker-Neer A-250-40	300	5,000
Cyclone Drlg & Workover Inc	8	dsl	800	Unit U-34	1342	6,000
ITT Eason Co	21	dsl-elec	2000	Emsco D-2	750	13,000
	19	dsl	1800	Emsco D-2	750	13,000
	20	dsl-elec	2000	Emsco D-3	1000	16,000
OKMULGEE						
Earnest Inc	1	dsl	6500	Cabot 500	400	6,500
	2	dsl	335	Cabot Franks	318	5,500
	3	dsl	6500	Cabot	400	
OSAGE						
Equity Drlg Co	150	dsl	300	Failing 2500	300	3,000/3½"
	164	dsl	200	Mayhew 2000	150	2,000/3½"
Layton Oil Co	6	dsl	250	Wilson Double Drum	250	3,000/2⅜"
McLennan Drlg Co	3	dsl	450	Franks Model 137	318	4,500
	5	dsl	450	Franks Model 658	318	4,000
PAYNE						
Bodard & Hale Drlg Co	4	dsl	400	M-CSCO U-34	400	6,500
Equity Drlg Co	175	dsl	300	Wilson Super 38	300	4,200
Kay Drlg Co	2	dsl	500	Cooper LTD 550	500	8,500
Mar-Tay Drlg Co	1		450	Cardwell K-200-C	350	5,000
PITTSBURG						
Arden Drlg Co	1	dsl-elec	1600	Continental Emsco D-2	1200	16,000
	3	dsl	2500	Continental Emsco C-1	1500	20,000
Big Chief Drlg Co	25	dsl	3000	National 110	2000	20,000
Dual Drlg Co	6	dsl	600	Emsco GB-350	560	7,500
R W I T Drlg Co Inc	9	gas-LPG	345	Wilson	280	6,000
Sloan Drlg Co	14	dsl	370	National T-20	500	6,500
Unit Drlg & Expl Co	5	dsl	950	Unit U-15	600	10,000
PONTOTOC						
Baulch Drlg Co	1	dsl	350	Brewster N-4	275	4,800
Bodard & Hale Drlg Co	11	dsl	400	Brewster N-4	450	6,000
Cyclone Drlg & Workover Inc	7	dsl	400	Unit U-34	955	
POTTAWATOMIE						
Bodard & Hale Drlg Co	16	dsl	550	Ideco H-37	400	6,500
Falcon Drlg Co	1	dsl	400	Bethlehem S-45-A	400	7,000
Jerry Scott Drlg Co Inc	1	dsl	350	Brewster N-4	350	5,500
	5	dsl	375	Bethlehem S-45	375	6,000
ROGER MILLS						
Baker & Taylor Drlg Co	3	dsl	1200	M-CSCO U-20	1200	18,000
	6	dsl	1400	M-CSCO U-40	1400	20,000
Big Chief Drlg Co	40	dsl-elec	3000	Emsco Electrohoist III	3000	25,000
E W Moran Drlg Co Inc	10	dsl	3000	OILWELL 96	2800	25,000
Helmerich & Payne Intl Drlg Co	89	dsl-elec	1500	National 110-UE	2000	20,000
Jimmie Austin & Sons Inc		dsl	1000	BDW 800-MI	900	15,000
Loffland Bros Co	123	gas	1975	National 130	2200	26,000
	311	dsl	2250	Gardner-Denver 1500	2500	24,000
Mercury Drlg Co	9	dsl	1350	Gardner-Denver 1500	2800	25,000
	3	dsl	1000	OILWELL 96	2010	22,000
Moran Drlg Corp	66	dsl	1400	Brewster N-75-A	1000	12,000
	3	gas	1800	Bethlehem M-810	1200	15,000
	34	dsl	1700	OILWELL 760	1200	15,000
	38	dsl-elec	3200	M-CSCO C-2	2000	25,000
Nicor Drlg Co	32	dsl-elec	1300	M-CSCO 1220-E	2000	25,000
	33	dsl-elec	1000	M-CSCO U-914-EC	1400	18,000
Noble Drlg Corp	GD-1	dsl	2650	Gardner-Denver 1500	3000	25,000
Parker Drlg Co	71	gas	2000	National 125	2000	23,000
Sharp Drlg Co Inc	58	dsl	2670	OILWELL 96	2895	23,000
Smart Drlg Co	7	dsl	1200	Unit U-20	1200	16,000
T R G Drlg Corp	22	dsl	1290	National 80-B	1305	14,500
Trigg Drlg Co Inc	8	dsl	1200	National 125	1600	20,000
Viersen & Cochran Drlg Co	19	dsl	800	National 610	830	12,000
SEMINOLE						
Jerry Scot Drlg Co Inc	7	dsl	350	Wilson Giant	350	7,000
Sloan Drlg Co	10	dsl	370	M-CSCO U-34	475	6,500
SEQUOYAH						
Dual Drlg Co	2	dsl	950	Wilson Giant	650	9,500
Miller Drlg Co	111	dsl	350	Spencer Harris 5000	300	6,000/3½"
STEPHENS						
Ardmore Drlg	4	gas	600	Wilson	400	500
Gay Drlg Contractors	1	gas	80	2500 Series Wichtex	80	2,800
Guffey-Schlensker Drlg Corp	2	dsl	600	Brewster N-45	700	8,000

OKLAHOMA (Cont'd)

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
STEPHENS (Contd)						
ITT Eason Oil Co	18	dsl-elec	2300	Emsco C-1E	1500	21,000
Jones Drlg Corp	11	dsl				8,500
	12	dsl				8,500
	5	gas	600	Spencer 7000	400	6,000
	6	dsl	600	Spencer 7000	400	7,000
Loffland Bros Co	227	dsl	2200	M-CSCO U-914-A	2500	22,000
Nicor Drlg Co	8	dsl	700	National 50-CA	950	11,000
Noble Drlg Corp	N-117	dsl	2250	National 110-UE	2000	22,000
Ratliff Drlg Co	10	gas	1020	National 50	1020	10,000
Smart Drlg Co	8	dsl	950	Brewster N-55	700	12,000
T R G Drlg Corp	1	dsl	1245	National 75	1305	13,500
	3	dsl	995	Unit U-15	1305	10,500
Top Drlg Inc	4	dsl	1200	OILWELL 660	1200	14,000
Vi-Rol Drlg Co	1	dsl	350	Wilson Mogul 42	350	5,500
	2	dsl	120	Howard-Turner M-110	210	2,000
TEXAS						
Gabbert-Jones Inc	12	dsl	500	M-CSCO U-15	500	6,000
Lohmann-Johnson Drlg Co Inc	10	dsl	350	National 50	600	5,500
	15	dsl	750	Brewster N-45	185	6,000
Sage Drlg Inc	6	dsl	400	Emsco 350	400	8,000
Service Drlg Co	5	dsl	600	Emsco U-15	800	10,000
	8	dsl	500	M-CSCO U-15	800	8,500
WASHITA						
Act Drlg Co	1	dsl	1750	Gardner-Denver 6-D 800	1000	16,000
Astro Drlg Co	19	dsl	912	Wilson Super Giant	912	12,500
Big Chief Drlg Co	37	gas	2200	Emsco 1250	1815	17,000
Bonray Drlg Corp	2	dsl	1650	OILWELL 860	1650	20,000
E W Moran Drlg Co Inc	11	dsl	2600	Wilson 150-A	1500	20,000
	9	dsl	1900	Ideco 1050-PR	1350	18,000
Helmerich & Payne Intl Drlg Co	85	scr	850	OILWELL 760-E	1100	
	48	dsl	1820	National 110	1820	22,000
	54	dsl	1450	OILWELL 76	1100	16,000
	55	gas	1555	National 55	1100	16,500
	76	dsl	1650	OILWELL 760	1650	16,500
	80	scr	2200	National 110-UE	1500	20,000
	82	scr	2800	OILWELL E-2000	2000	26,000
Loffland Bros Co	196	dsl-elec	3300	M-CSCO U-1220	2200	28,000
	218	dsl-elec	3300	M-CSCO U-1220-E	2200	28,000
	244	dsl-elec	2500	M-CSCO U-1220-E	2200	28,000
	32	dsl-elec	4000	Emsco CE-3000	3300	35,000
	324	dsl	2250	Gardner-Denver 1500	2500	24,000
	70	dsl-elec	3200	M-CSCO U-1220-EB	2000	32,000
Murco Drlg Corp	50	scr	2200	OILWELL 860-E	2000	18,000
Noble Drlg Corp	OW-22	dsl-elec	2800	OILWELL E-2000	2000	25,000
Parker Drlg Co	192	gas	1400	OIME 1000	1400	16,000
Ratliff Drlg Co	14	dsl	2640	M-CSCO U-1220-B	2640	28,000
Rowan Drlg U S	14	dsl	3200	National 1625-M	3000	35,000
	5	dsl	3200	National 1625-M	3000	35,000
Smart Drlg Co	11	dsl	1000	National 100	1500	18,000
T R G Drlg Corp	130		2200	Gardner-Denver 3000-E	2400	18,000
	20		2200	Gardner-Denver 1100-E	2400	18,000
Viersen & Cochran Drlg Co	6	dsl	2000	Bethlehem 1013	2400	25,000
WOODS						
E L Oliver Drlg Co	3	dsl	340	National T-12	250	5,000/4"
Lohmann-Johnson Drlg Co Inc	5	dsl	300	National 50	440	4,500
Sage Drlg Co Inc	5	dsl	400	National T-32	400	6,700
Thomas Drlg Co	2	dsl	300	National T-32	300	7,500
	8	dsl	300	Ideco H-35	300	7,500
Top Drlg Inc	3	dsl	400	OILWELL 500	450	8,500
WOODWARD						
Bonray Drlg Corp	3	gas	900	Brewster N-7	900	10,500
Eagle Drlg Inc	4	dsl	1100	M-CSCO U-15	850	10,000
Hickman Drlg	5	dsl	1450	BDW 800	1100	14,000
Pulliam Drlg Co	18	dsl	700	Emsco GA-250-T	350	8,000
Rine Drlg Co	6	gas	700	Brewster N-75	750	12,000
Triad Drlg Corp	2	dsl	340	Brewster N-45	550	9,000

OREGON

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
CLACKAMAS						
Taylor Drlg Co	4	dsl	750	National 50	750	9,000

PENNSYLVANIA

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
UNDESIGNATED						
Caster Well Drlg Inc		dsl		Jaswell 2400	150	2,400
		dsl		Jaswell 3500		3,500
Underwater Gas Dev Ltd	1	dsl	250	Failing 3500	200	40,000
CLARION						
Fairman Drlg Co	11	dsl	400	Ideco H-44	500	8,000
CLEARFIELD						
Delta Drlg Co	69	dsl		Spencer 7000	480	9,000
Fairman Drlg Co	6	dsl	350	Ideco H-44	550	8,000

PENNSYLVANIA (Cont'd)

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
CLEARFIELD (Contd)						
Fairman Drlg Co	8	dsl	350	Ideco H-44	550	8,000
CRAWFORD						
Delta Drlg Co	92	dsl	250	Ideco H-35-KD	291	6,000
	91	dsl	400	Ideco H-35-KD	291	6,000
	77	dsl	400	Ideco H-35-KD	291	6,000
	78	dsl	400	Ideco H-35-KD	291	6,000
	79	dsl	250	Ideco H-35-KD	291	6,000
ERIE						
Intl Petroleum Serv Co	3	dsl	350	CP-T-750-DH	285	4,500
	4	dsl	475	Wilson 42	475	7,500
Union Drlg Inc	10	dsl		Ideco H-37	425	6,500
INDIANA						
Fairman Drlg Co	10	dsl	400	Wilson Mogul 42	350	5,000
	5	dsl	400	Cardwell	350	4,000
	9	dsl	400	Ideco H-44	500	8,000
JEFFERSON						
Fairman Drlg Co	12	dsl	400	Ideco	250	5,000
SOMERSET						
Delta Drlg Co	71	dsl	400	Spencer 7000	440	9,000/4"
	72	dsl	400	Spencer 7000	440	9,000
WARREN						
Intl Petroleum Serv Co	5	dsl	475	Wilson 42	475	7,500

SOUTH DAKOTA

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
HARDING						
Bomac Drlg	32	dsl	760	Ideco H-40	760	8,500

TENNESSEE

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
CUMBERLAND						
B-J Inc	1	dsl	525	Ingersoll-Rand	525	3,000
	2	dsl	525	Ingersoll-Rand	525	3,000
	3	dsl	400	Drill-Tec	400	2,500
FENTRESS						
Miller Drlg Co Inc	10	dsl	525	Ingersoll-Rand	525	3,000
Norman Drlg Co	2	dsl	750	Ingersol	450	2,500
	1	dsl	750	Ingersol	450	2,500
HAWKINS						
Ray Resources	7	dsl	1000	Cardwell KB-500	600	8,000
JACKSON						
Miller Drlg Co Inc	9	dsl	525	Ingersoll-Rand	525	3,000
OVERTON						
Miller Drlg Co Inc	17	dsl	400	Spencer Harris	400	3,000
	19	dsl	400	Brewster N-4	400	6,000
	2	dsl	400	Ingersoll-Rand	400	3,000
SCOTT						
Miller Drlg Co Inc	16	dsl	525	Ingersoll-Rand	525	3,000
WARREN						
Miller Drlg Co Inc	20	dsl	400	Ideco H-37	400	6,000

TEXAS

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
UNDESIGNATED						
Adeco Drlg & Engr Co Ltd	18	dsl	700	OIME Helihoist 500-C	1370	23,000
Challenger Drlg	17	dsl	1900	Cabot 1000	1000	12,000
Chico Drlg Co Inc	1	dsl	550	Unit Rig U-15-A	1050	11,000
	2	dsl	550	Unit Rig U-15-A	1050	11,000
	4	dsl	700	Unit Rig U-15-A	1050	11,000
	5	dsl	350	Unit Rig U-10-A	428	6,000
Franklin Drlg Inc	3	dsl	500	Walker-Neer	500	7,000
	4		250	Brewster	250	3,200/3½"
Harris Well Serv Inc	26	dsl	632	Ideco H-44	750	10,000
Loffland Bros Co	117	dsl-elec	3200	M-CSCO U-1220-EBD	3000	28,000
	118	dsl-elec	3200	M-CSCO U-1220-EBD	3000	28,000
Marlin West	13	dsl-elec	2000	National 110		14,000
Mallard Well Serv Inc	11	dsl	800	Wilson Model 90	800	11,000
	12	dsl	800	Wilson Model 90	800	11,000
Murlynson Drlg Co	10	dsl	1000	M-CSCO U-15	600	10,000
P H D Drlg Co	1	btne	180	Wilson	145	4,000
	9	btne	145	Cardwell	145	3,500
Pete Murphy Drlg Co	1	dsl	800	Cardwell C-Horse	300	5,500
Robinson Bros Drlg Co	1	dsl	1000	Brewster N-75	1200	13,500
	3	dsl	1000	Wilson 75	900	9,000
	6	dsl	2200	National	1600	18,000
	7	dsl-elec	1750	National 80-UE	1500	16,000
	9	dsl-elec	1700	Ideco 1200	2000	22,000
Safari Drlg Corp	7	dsl	480	Emsco G-42	560	7,000/4"
Santa Fe Drlg Co	SFW-10	dsl-elec	2000	Emsco Electrohoist H-11	1800	24,000
	SFW-12	dsl-elec	2300	Emsco A-1100-E	1800	20,000
	SFW-14	dsl-elec	3200	Emsco C-3111	3000	30,000
	SFW-2	gas	1700	Bethlehem M-1013	2118	22,000
	SFW-3	dsl-elec	2900	Emsco A-1500-E	2000	30,000
	SFW-4	dsl-elec	2600	Emsco C-3111	3000	30,000

TEXAS (Cont'd)

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
UNDESIGNATED (Contd)						
Santa Fe Drlg Co	SFW-5	gas	2200	Bethlehem B-1013	2118	22,000
	SFW-6	dsl-elec	2300	Emsco C-3111	3000	30,000
	SFW-7	dsl-elec	2600	Emsco C-3111	3000	30,000
	SFW-8	dsl-elec	2600	Emsco A-1500-E	2000	30,000
Syntek Drlg Corp	1	dsl	500	National T-12	500	5,000
	2	dsl	250	Wilson	250	4,200
Tucker Drlg Co Inc	2	dsl	750	Emsco GB-500	750	10,000
	5	dsl	750	Emsco GE-500	750	10,000
ANDERSON						
Cape Drlg Co	5	dsl	400	Walker-Neer Apache 950-40	425	6,000
Globe Drlg Co Inc	3	dsl	800	M-CSCO U-15	800	12,000
	5	dsl	850	OILWELL 76	1000	14,000
Lanford Drlg Co Inc	3	dsl	300	Joy	200	2,000
ANDREWS						
Cactus Drlg Co	54	dsl	502	Bethlehem S-55	454	6,500
	10	dsl	800	Bethlehem M-58	984	11,000
Cherokee Drlg & Dev Corp	5	dsl	900	BDW 450	531	7,000
Hillin Drlg Co Inc	4	dsl	900	National 50-A	900	11,000
	5	dsl	1200	National H-1200	1200	15,000
	8	dsl	500	Wilson 42 Mogul	400	5,000
Rod Ric Corp	10	dsl	670	Emsco G-500	600	8,500/4"
	3	dsl	670	Brewster N-45-M	600	9,000/4"
	6	dsl	450	Bethlehem S-45-E	450	7,000/4"
	7	dsl	770	Wagner Helihoist	900	10,000/4"
	8	dsl	670	Brewster N-45	600	8,000/4"
Tahoe Drlg Co	2	cat	600	Brewster N-4	458	7,000
Tom Brown Inc	2	dsl	375	National T-16	380	5,000
ATASCOSA						
Delta Drlg Co	87	dsl-scr	2000	Emsco D-3 Type II	2592	16,000
AUSTIN						
Drillers Inc	15	dsl	1000	OILWELL 66	850	12,000
Nicklos Drlg Co	77	dsl-elec	1600	Emsco C-1-II	1530	16,000
Penrod Drlg Co	22	dsl	2600	National 1320-N	1950	25,000
BAYLOR						
Lin-Mour Drlg Corp	3	gas	250	Unit 34	180	5,000
BRAZORIA						
Richards Operating Co	2	dsl	1500	Brewster N-75	1200	12,500
BEE						
Buzzini Drlg Co	9	dsl	3600	OILWELL M-2000	2400	25,000
BORDEN						
Cactus Drlg Corp	34	dsl	1290	National 75	1230	12,000
Hondo Drlg Co	9	dsl	1050	Brewster N-55	800	10,000
J W McCutchen Drlg Co	3	dsl	900	Wilson Atlas Roadair	900	10,000
Wes-Tex Drlg Co	4	dsl	650	Emsco G-500	650	1,000
BRAZORIA						
Bawden Drlg Inc	3	scr	2100	National 110-E	1500	16,000
Loffland Bros Co	322	dsl	1800	Gardner-Denver 800	2100	17,000
BRAZOS						
Atco Drlg Inc (Southern)	59	dsl	2000	Emsco 11-C	2000	18,000
Blocker Drlg Co	15	dsl	845	Cabot Series 900	950	10,000
	2	dsl	815	Cabot Series 750	650	7,500
	4	dsl	1200	National 55	1530	12,000
Helmerich & Payne Intl Drlg Co	41	dsl	1650	National 110	1650	22,000
BROOKS						
Delta Drlg Co	95	dsl-elec	3456	Emsco C-I Type II	2900	20,000
Flournoy Drlg Co	9	dsl	900	C-Emsco C-50	480	9,000/4"
Harkins & Co	7	dsl	1650	National 110	1650	16,000/5"
Rowan Drlg U S	7	dsl	3200	Emsco A-1500	2500	22,000
Willis Drlg Co Inc	5	dsl	800	M-CSCO U-15	800	10,000
	6	dsl	3000	Ideco	3000	25,000
BURLESON						
B D K Drlg Co	6	dsl	870	Skytop/Brewster 4610	950	10,000
Beta Drlg Inc	1	dsl	1260	National T-45	900	10,500/4"
	2	dsl	1260	National T-45	900	10,500
	3	dsl	1260	National T-45	900	10,500
	4	dsl	2000	National 100	1575	16,000
	5	dsl	1700	Brewster N-85	1560	14,000
	6	dsl	1260	National 55	1100	12,000
	7	dsl	2000	National 110	1650	18,000
	9	dsl	1000	Ideco H-1000	850	11,500
Bilbo Drlg Co	3	dsl	900	Cardwell KB-250	600	10,000/4"
Blocker Drlg Co	5	dsl	1300	Cabot Expl Rocket 900	950	10,000
	7	dsl	950	Cabot Series 900	600	10,500
Burris Drlg Co	105	dsl	1000	M-CSCO 36-A	1000	13,000
	106	dsl	1000	National 50-CA	1000	11,000
Crawford Drlg Co	5	dsl	600	M-CSCO U-15	800	10,000
Culver Drlg Co	12	dsl	1000	National 55	1000	11,000
	15	dsl-elec	1000	National 110	2000	16,000
	17	dsl	1000	OILWELL 66	670	9,500
D B Drlg Corp	7	dsl	1230	National 50-A	980	12,000
	12	dsl	1250	National 100	1250	15,000
Dual Drlg Co	1	dsl	1500	Wilson 75-P	900	12,500
	5	dsl	1500	Wilson Mogul	600	9,500
BURLESON (Contd)						
F-W Drlg Co	11	dsl	750	Brewster N-46	800	12,000
	8	dsl	600	Ideco H-725	725	10,500
	9	dsl	600	Ideco H-725	800	12,000
France Drlg Co	1	dsl	1600	Gardner-Denver 700	900	13,000
Hondo Drlg Co	2	dsl	1050	M-CSCO U-15-A	700	9,500
	8	dsl	1100	Brewster N-55	800	11,000
MGF Drlg Co-Midland	7	dsl	850	Brewster N-55	850	12,000
New & Hughes Drlg Co Inc	12	dsl	800	Wilson Giant	800	13,000
PRC Drlg Co	3	dsl	1250	Skytop/Brewster N-46	730	10,000
Richards-Armstrong Inc	7	dsl	1900	Cabot 1000	900	12,500
Southland Drlg Co Inc	7	dsl	650	Brewster N-55	600	10,000
Sterling Drlg Co	11	dsl	375	Ideco H-30	480	6,500
	12	dsl	1500	National 610	1100	14,000
	2	dsl	1500	National 610	1150	13,000
	3	dsl	800	National 50-CA	820	10,000
Tierra Drlg Corp	10	dsl	650	BDW-650	700	12,000
Tom Brown Inc	26	dsl	700	Gardner-Denver 500	700	11,000
BURNET						
McDonald & Son Drlg Co	2000	dsl		Failing	300	1,500
CALDWELL						
McConnell Drlg Co	1	dsl	300	National T-12	200	3,000
Nixon Drlg Co Inc	1	dsl	3306	Cardwell Cat-D	3306	4,000
	2	dsl	3306	Cardwell	3306	4,000
Rosamond Drlg Co	7	dsl	1450	Brewster N-10	1275	13,500
CALHOUN						
Alanco Drlg Co	1	dsl	500	Ideco H-40	500	8,500
B D K Drlg Co	4	dsl	1095	Brewster N-7	870	11,500
CALLAHAN						
Hack Drlg Co	3	dsl	350	Bethlehem S-45-E	350	7,000
Safari Drlg Corp	4	dsl	310	National T-20	270	6,000
CAMERON						
Blocker Drlg Co	9	dsl	1250	Ideco Hydrair H-1000	950	10,500
CARSON						
Service Drlg Co	11	dsl	420	M-CSCO U-34	420	6,000
CASS						
N & G Drlg Corp	3	dsl	1800	Skytop/Brewster N-46	900	13,000
Noble Drlg Corp	N-58	dsl	1550	National 55	700	12,000
CHAMBERS						
Big 6 Drlg Co	7	dsl	800	Ideco	600	10,000
Drillers Inc	5	dsl	900	Unit U-15-M	1200	11,000
Goldrus Drlg Co	18	dsl	1700	1000 Cabot	872	14,000
	20	dsl	1950	Cabot 1200	1054	15,000
Justiss-Mears Oil Co Inc	8	dsl	450	Emsco GA-500	900	11,000
Thunderbolt Drlg Inc	52	dsl	1700	National 55	1845	13,000
CHEROKEE						
Gibson Drlg Co	5	dsl	1030	Wilson 75-P	700	9,000
	8	dsl	529	Wilson 65	380	5,000
Schlensker Drlg Corp	6	gas	700	Unit U-15	800	10,000
Wheless Drlg Co	10	dsl	1800	National 100	1800	14,000
CLAY						
Burns L D Drlg Co	3	dsl	1220	Wilson 75	600	10,000
Crawford Drlg Co	2	dsl	600	M-CSCO U-15	800	10,000
Lin-Mour Drlg Corp	6	dsl	700	Wilson Giant	700	9,000
Megargel Drlg Co	14	dsl	750	Unit U-15 Treble	750	8,000
MND Drlg Corp	61	dsl	600	M-CSCO U-15	600	9,000
Oilwell Drlg Inc	4	dsl	476	Ideco 30	476	5,500
COKE						
Cam Drlg Inc	1	dsl	500	Bethlehem S-45-E	650	8,000
F-W Drlg Co	2	dsl	500	M-CSCO U-34	480	7,000
	6	dsl	420	National T-20	420	6,000/4"
Tom Brown Inc	14	gas	680	M-CSCO U-15	680	10,000
Wes-Tex Drlg Co	14	dsl	335	Brewster N-4	500	8,000
COLEMAN						
C & H Drlg Co	4	dsl		Ideco H-38-D	350	5,000
Safari Drlg Corp	6	dsl	300	Emsco U-34	370	6,000
Tri-J Drlg Co	3	dsl	500	Mayhew 3000	250	3,000
COLORADO						
Bilbo Drlg Co	1	dsl	500	Brewster N-4-A	500	8,000/4"
Doss Inc	1	dsl	353	Cooper T-6	425	7,000
Padre Drlg Co Inc	7	dsl	700	Skytop/Brewster H-14610	750	10,000
COMANCHE						
Bates Drlg Co Inc	6	dsl	1560	M-CSCO U-20	1040	16,000
J & M Drlg Co	1	dsl-gas	180	Hydril M-H	220	4,000
J & W Drlg Co	2	gas	180	Ideco 150	180	3,500
CONCHO						
Tucker Drlg Co Inc	7	dsl	375	Bethlehem 5-60	600	7,000
COOKE						
Felderhoff Bros Drlg Co	1	gas	285	Wilson Mogul	185	5,200
Parker Drlg Co	47	gas	2000	OIME 1500-P	2000	20,000

TEXAS (Cont'd)

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
COTTLE						
Safari Drlg Corp	2	dsl	370	Cardwell L-350	370	7,000
CRANE						
Ard Drlg Co	4	dsl	900	M-CSCO U-15	900	12,000
Hillin Drlg Co Inc	6	dsl	500	Ideco H-25 Trailer Rig	360	5,000
John Drlg Co	8	gas	1050	Brewster N-75	700	10,000
Tom Brown Inc	1	dsl	350	M-CSCO U-15	500	7,000
	20	dsl	375	Ideco H-400	500	7,000
CROCKETT						
D B Drlg Corp	5	dsl	675	Brewster N-4	500	7,000
Delta Drlg Co	70	dsl	1000	Spencer 6000	440	9,000
	86	dsl	500	Spencer Port-A-Pig 7000	480	9,000
Texland Drlg Corp	2	dsl	750	Unit U-34	368	7,100
Tri-Service Drlg Co	4	gas	700	OILWELL 66	750	10,000
Tucker Drlg Co Inc	9	dsl	750	National	750	10,000
	6	dsl	750	Brewster N-75	750	12,000
Wes-Tex Drlg Co	17	dsl	335	Unit U-34	500	8,000
	2	dsl	650	Bethlehem S-45-E	650	10,000
	6	dsl	650	Bethlehem S-60	700	10,000
	8		335	Dsl	500	8,000
CULBERSON						
Parker Drlg Co	88	gas-elec	2000	National 130	3000	25,000
DAWSON						
Delta Drlg Co	98	dsl	1500	Wilson Giant Roadair	784	12,500
Gene Sledge Drlg Corp	4	dsl	600	U-15	800	10,000
Robinson Drlg of Texas Inc	6	dsl	950	Bethlehem M-58	1350	12,500
	4	dsl	750	National 50-A	900	12,500
Tri-Service Drlg Co	2	gas	750	OILWELL 66	700	10,000
	3	gas	700	OILWELL 76	750	13,000
	5	gas	1800	OILWELL 760	1400	16,000
Wes-Tex Drlg Co	9	dsl	700	National 50-A	700	10,000
Willbaos Drlg Inc	5	gas	1100	Bethlehem 450	1100	13,000
DEWITT						
B D K Drlg Co	1	dsl	700	Wilson Giant	580	8,500/4"
Bilbo Drlg Co	4	dsl	800	Cabot 900	900	11,500/4"
Buzzini Drlg Co	10	dsl	3600	OILWELL M-2000	2400	25,000
FWA Drlg Co Inc	16	dsl	600	Wilson Mogul 42	800	9,000
MGF Drlg Co	39	dsl	2450	National 125	2450	18,000
Penrod Drlg Co	107	dsl	1000	National 80-B	1760	15,000
Texas Drlg Co	5	dsl	1700	Cabot M-2550	1200	17,000
DIMMITT						
Cinco Drlg Co	7	dsl	960	M-CSCO J-34	425	6,500
Sundown Drlg Co	1	dsl	450	Emsco 160-GB	400	5,500
DUVAL						
Delta Drlg Co	88		2600	Emsco C-1 Type 11-E	3456	18,000
Harkins & Co	4	dsl	1260	Brewster N-75	1260	12,500
	8	dsl	1800	National 110	1800	16,000
EASTLAND						
Sweetwater Drlg Co Inc	4	dsl	575	National T-20	475	6,500
Tierra Drlg Corp	2	dsl	650	Bethlehem S-45	650	7,000
ECTOR						
Brahaney Drlg Co Inc	7	gas	1400	OILWELL	1400	17,000
Cactus Drlg Co	53	dsl	502	Bethlehem S-55	875	7,500
	58	dsl	446	Bethlehem S-45-E	454	6,500
	60	dsl	502	Bethlehem S-45-E	454	6,500
	9	dsl	1200	Brewster N-75	1476	13,500
Kenai Drlg of Texas Inc	32	dsl	600	Emsco GA-500	800	
Pool Well Serv Co	100	dsl	300	Wilson Mogul 42 Double Drum	450	5,500
Rod Ric Corp	2	dsl	700	Bethlehem S-45-E	450	7,000/4"
	4	dsl	750	Ideco H-40	600	8,500/4"
Sharp Drlg Co Inc	47	dsl	1200	Bethlehem M-58	988	10,500
	64	dsl	2200	OILWELL 760	1836	18,000
	67	dsl	2600	M-CSCO U-914-C	2742	20,000
Tom Brown Inc	18	dsl	840	M-CSCO U-15-CA	840	10,000
Verna Drlg Co	11	dsl	500	M-CSCO U-15		11,500
	12	dsl	500	M-CSCO U-15	600	11,500
	13		600	Brewster N-4	400	6,500
	14	dsl	500	Wilson Mogul 42	550	7,000
	15	dsl	600	M-CSCO	600	11,500
	16	dsl	600	Brewster N-14	450	6,500
	17	dsl	550	M-CSCO U-15	650	11,500
	18	dsl-elec	1000	National 1320-E	2000	22,000
	19	dsl	550	M-CSCO U-15	600	11,500
	20	dsl	1000	Vernal Drlg	15000	13,000
ELLIS						
Triad Drlg Corp	4	dsl	900	Brewster N-7	900	11,000
ERATH						
I X Drlg Co Inc	7	dsl	476	Cardwell TR-350	416	7,500
FAYETTE						
B D K Drlg Co	8	dsl	960	Skytop/Brewster 4610	750	10,000
Cactus Drlg Corp	22	dsl	1650	National 100	2025	18,000
	23	dsl	1700	National 100	1894	17,000
	29	dsl	1500	National 80-B	1770	16,000
	7	dsl	1500	OILWELL 76	1770	14,000
FAYETTE (Contd)						
Delta Drlg Co	81	dsl	1300	Spencer 7000	480	9,000
Dixon Drlg Co	10	dsl	500	Bethlehem S-60	500	10,000
G-E Drlg Inc	6	dsl	900	National 50-CA	900	10,100
Sterling Drlg Co	10	dsl	1400	Brewster N-75	1100	13,000
	15	dsl	1400	Brewster N-75	1100	14,500
	5	dsl	1230	National 50-CA	820	11,000
Texland Drlg Corp	5	btne	920	Unit U-15	680	10,000
Tierra Drlg Corp	9	dsl	650	Unit U-15	700	10,000
Tom Brown Inc	10	dsl	750	M-CSCO U-15-CA	750	10,000
	25	dsl	700	Gardner-Denver 500	700	11,000
	9	dsl	1125	National 75-CA	1125	14,000
FISHER						
D B Drlg Corp	2	dsl	675	National T-32	460	7,500
Sojourner Drlg Corp	2	dsl		M-CSCO U-15	550	7,000
Tri-J Drlg Co	5	dsl	375	Wichtex R-6-A	350	5,000
FOARD						
Jack E Bearden Drlg Co	5	dsl	1200	Wilson Mogul	600	9,000
FORT BEND						
Atco Drlg Inc (Southern)	55	dsl	1800	National 80-UE	1800	15,000
Butler Drlg Corp	9	dsl	1250	Gardner-Denver 500	600	10,500
Cactus Drlg Corp	3	dsl	1500	National 80-B	1770	16,000
O'Connor & Young Drlg Co	101	dsl	1600	National 610	850	12,000
Southland Drlg Co	5	dsl	700	Brewster N-55	700	10,000
FRANKLIN						
United Drlg Co of Tyler	10	dsl	950	Unit U-34	470	8,000
FREESTONE						
Eagle Prod & Drlg Serv Inc	5	dsl-elec	3300	OILWELL E-2000	2000	25,000
France Drlg Co	2	dsl	1700	OILWELL 760	1700	17,000
	3		2400	OILWELL 3-760	2400	17,000
FWA Drlg Co	26	dsl	1350	Gardner-Denver 800-M	1350	15,000
	27	dsl	2000	Gardner-Denver 800-M	1350	15,000
	28	dsl	1500	Gardner-Denver 1100	1500	18,000
Maxwell Herring Drlg Corp	17	dsl	2500	Bethlehem	2400	20,000
O'Connor & Young Drlg Co	203	dsl	2600	Brewster NE-95	1750	18,000
Rosamond Drlg Co	6	dsl	1650	Emsco A-550	1275	14,000
United Drlg Co of Tyler	8	dsl	1600	Bethlehem M-58	1200	13,000
W B Hinton Drlg Co Inc	3	dsl	1700	National 80-B	1300	15,000
	7	dsl	1600	National 80-B	1650	15,000
FRIO						
Bearden Jack E Drlg Co	6	dsl	1200	Wilson 75	700	9,000
Cactus Drlg Co	55	dsl	502	Ideco H-35	670	6,500
	62	dsl	502	Ideco H-35	454	6,500
Cinco Drlg	2	dsl	890	National T-32	850	8,000
GAINES						
A N Norwood Inc	2	dsl	700	Brewster N-4	450	6,000
Cactus Drlg Co	52	dsl	550	Ideco H-35	454	6,500
	63	dsl	502	Brewster N-4	454	6,500
	66	dsl	502	Brewster N-4	454	6,000
Cherokee Drlg & Dev Corp	3	dsl	1150	Wilson 75	900	11,000
Landis Drlg Co	3	dsl	800	Brewster N-55	900	11,500
Moranco	5	dsl	750	M-CSCO U-15	750	11,000
Tom Brown Inc	3	gas	680	National 50	680	10,000
	7	dsl	1050	National 75	1050	14,000
GALVESTON						
Big 6 Drlg Co	2	dsl	800	Franks	600	10,000
Butler Drlg Co	2	dsl	1450	Brewster N-75	1100	12,500
	4	gas	1600	Gardner-Denver 1100	1600	18,000
Eagle Prod & Drlg Serv Inc	4	dsl-elec	2700	OILWELL E-760	1000	16,000
Inland Well Serv Inc	8	dsl	400	Ideco H-35	350	6,000
Nicklos Drlg Co	78	dsl	1400	National 80-B	1080	14,000
GARZA						
Brahaney Drlg Co Inc	3	gas	900	National 75-CA	900	12,000
J W McCutchen Drlg Co	4	dsl	900	Wilson 90	900	12,500
Moran Drlg Corp	55	dsl	600	Wilson Super 38	350	5,000
Robinson Drlg of Texas Inc	5	dsl	750	M-CSCO U-15	900	9,500
Wes-Tex Drlg Co	11	dsl	450	Bethlehem S-55	700	10,000
GLASSCOCK						
Brahaney Drlg Co Inc	1	gas	900	National 75-CA	900	12,000
Kenai Drlg of Texas Inc	16	dsl	700	Emsco GA-500	780	11,000/4"
GOLIAD						
B D K Drlg Co	9	dsl	1480	Brewster N-75	1000	12,000
Blocker Drlg Co	17	dsl	825	Spencer Harris	750	6,000
Corpus Christi Drlg Co	6	dsl	300	Skytop/Brewster 550	450	6,000
Padre Drlg Co Inc	8	dsl	700	Skytop/Brewster H-14610	750	10,000
PRC Drlg Co	4	dsl	758	Cabot Franks 900	900	10,000/4"
GONZALES						
Blocker Drlg Co	3	dsl	1475	Cabot Expl Rocket 111 1000	950	12,000

TEXAS (Cont'd)

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
GONZALES (Contd)						
Cinco Drlg	1	dsl	900	M-CSCO U-15	780	11,000
	4	dsl	1005	Brewster N-45	780	8,500
	6	dsl	1080	M-CSCO U-15	780	11,000
O'Connor & Young Drlg Co	102	dsl	1600	National 610	850	12,000
South Texas Drlg Co	5	dsl	500	Brewster N-45	500	8,000
South Texas Drlg Co	6	dsl	500	Skytop/Brewster N-46	800	10,000
Southland Drlg Co Inc	1	dsl	700	Emsco GB-500	700	10,000
Texas Drlg Co	6	dsl	1200	Cabot M-25	950	11,000
Tom Brown Inc	6	dsl	900	National 75-CA	900	12,500
GRAY						
Baker & Taylor Drlg Co	11	dsl	1140	Emsco GCA-500	1140	12,000
GRAYSON						
Big Chief Drlg Co	30	gas	2000	Ideco 1050	1515	15,000
E W Moran Drlg Co	21	dsl	1600	Wilson 120	1000	15,000
	14	dsl	1600	Wilson 150	1000	15,000
	3	dsl	1100	Wilson Giant	800	12,000
	16	dsl	750	Spencer 7000	500	8,000
Guffey-Schlensker Drlg Corp	1	dsl	700	Unit U-36-A	933	11,000
Jones Drlg Corp	10	gas	1000	National 100	1000	18,000
Schlensker Drlg Corp	4	gas	700	Unit U-15	800	10,000
T R G Drlg Corp	5	dsl	1400	Wilson Atlas	1305	13,000
GREGG						
Rainbow Drlg Co	4	dsl	1300	Cabot 900	950	14,000
GRIMES						
Matagorda Drlg Co	10	dsl	1600	Emsco D-2	1000	12,000
Nicklos Drlg Co	76	dsl-elec	2600	National 1320-UE	1800	25,000
HALL						
Jack E Bearden Drlg Co	1	dsl	1200	Wilson Mogul 42	700	9,000
HANSFORD						
Baker & Taylor Drlg Co	9	dsl	870	M-CSCO U-15	870	11,000
HARDEMAN						
Crawford Drlg Co	4	dsl	600	M-CSCO U-15	800	9,500
Jack E Bearden Drlg Co	8	dsl	1200	Wilson 75	700	10,000/4"
Luke Grace Drlg Co Inc	1	gas-btne	500	M-CSCO U-15	750	10,500
E W Moran Drlg	18	dsl	800	Spencer 7000	500	800
HARDIN						
Big 6 Drlg Co	6	dsl	800	Cabot	950	12,000
Faith Drlg Co	2	dsl	1500	National 55	1300	12,000
Loffland Bros Co	110	dsl	2160	Brewster N-12	2400	22,500
Richards Operating Co	4	dsl	1400	OILWELL 66	1200	10,500
Stone M L Drlg Co	2	gas	100	Wilson Jr	100	2,000
HARRIS						
Big 6 Drlg Co	3	dsl	750	Franks	600	11,000
Cactus Drlg Corp	25	dsl	1100	Ideco 7-11	1400	12,500
Goldrus Drlg Co	19	dsl	1110	Cabot 750	560	10,000/4"
	23	dsl	870	Franks 900	680	12,000
Harkins & Co	3	dsl	1260	Brewster N-75-A	1260	12,500
Matagorda Drlg Co	11	dsl	2600	National 110	2000	18,000
San Jacinto Drlg Co	2	gas-dsl	1250	Cardwell	600	9,000
Southland Drlg Co Inc	11	dsl	2300	M-CSCO A-1500	2300	24,000
HARRISON						
Gibson Drlg Co	4	dsl	506	Wilson Mogul Model 65	398	5,000
	6	dsl	506	Wilson Mogul 42	318	5,000
Noble Drlg Corp	OW-77	dsl	1400	OILWELL 760	1000	13,000
Pool Well Serv Co	122	dsl	375	M-CSCO U-34	350	5,500
Sawyer Drlg & Serv Inc	3	dsl	1100	Brewster N-7	1100	12,000
HARVARD						
Justiss-Mears Oil Co Inc	33	dsl	1000	OILWELL 96	1400	17,000
HASKELL						
F-W Drlg Co	4	dsl	500	M-CSCO U-34	480	7,000/4"
Sojourner Drlg Corp	1	dsl		M-CSCO U-15	550	7,000
HEMPHILL						
Baker & Taylor Drlg Co	2	dsl	1400	M-CSCO U-20	1400	20,000
	8	dsl	870	M-CSCO U-15	870	11,000
Drillers Inc	24	dsl	700	Brewster N-55	700	11,000
	29	dsl	1200	Ideco 700-E	1000	14,000
E W Moran Drlg Co Inc	2	dsl	1500	Gardner-Denver 700	1000	13,500
	4	dsl	1300	Wilson 120	1000	15,000
Helmerich & Payne Intl Drlg Co	46	dsl	1200	Emsco GB-[illegible]	1200	13,500
	49	dsl	1600	National 110	1600	20,000
Hickman Drlg Co	2	dsl	1150	Wilson Giant	800	12,000
Leonard Hudson Drlg Co Inc	2	dsl	500	M-CSCO U-15	900	9,000
Moran Drlg Corp	37	dsl	1000	National 610	1000	12,000
Parker Drlg Co	142	dsl	3000	National 1320-E	3000	25,000
	149	gas	1200	National 75	1200	16,000
	164	dsl	1650	OIME SL-1500-P	1650	20,000
	178	dsl	2200	OIME SL-1500-P	2200	25,000
Sharp Drlg Co Inc	39	dsl	2970	OILWELL M-2000	2742	30,000
Trigg Drlg Co Inc	7	dsl	1200	Brewster N-95	1600	20,000
Unit Drlg & Expl Co	6	dsl	950	Unit U-15	882	11,000
Zenith Drlg Corp Inc	2	dsl	600	Emsco GB-350	600	8,500
	5	dsl	1100	Emsco M-58	1100	15,000

TEXAS (Cont'd)

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
HENDERSON						
Delta Drlg Co	44	dsl	1700	Brewster N-95	1560	16,000
E W Moran Drlg Co Inc	6	dsl	900	Bethlehem S-55	750	10,000
Lohmann-Johnson Drlg Co Inc	17	gas	800	M-CSCO U-15 S/N 356	600	10,000
Maxwell Herring Drlg Corp	12	dsl	1500	Wilson 150-A	2500	15,000
United Drlg Co of Tyler	5	dsl	1200	Skytop/Brewster N-75	1200	15,000
W B Hinton Drlg Co Inc	6	dsl	1600	National 80-B	1650	15,000
HIDALGO						
Blocker Drlg Co	1	dsl	815	Cabot Series 750	650	9,500
	14	dsl	2500	National 110	2730	20,000
Corpus Christi Drlg Co	4	dsl	300	Wilson Super 38	250	5,450/3½"
Flournoy Drlg Co	7	dsl	1775	OILWELL 76	1176	13,500
Harkins & Co	1	dsl	1080	Skytop/Brewster N-75	1080	12,500
	13	dsl	800	Cabot 1000	1000	12,000
Marlin Drlg Co Inc	8	dsl-elec	1600	National 80-B	1500	12,000
Resource Drlg Inc	16	dsl	1560	National 80-B	1835	14,000
	2	dsl	1560	National 80-B	1835	14,000
Willis Drlg Co Inc	2	dsl	1000	Bethlehem B-Line MC-450	1000	12,000
	4	dsl	1200	Brewster N-85	1200	14,000
HOCKLEY						
B B L Drlg Corp	2	dsl	500	Wilson Mogul 42	760	6,500
D B Drlg Corp	1	dsl	660	Brewster N-4	500	7,500
Norton Drlg Co	1	dsl	450	Wilson 65-P	900	10,000
Sitton Drlg Co	5	dsl	650	Wilson 75-P	900	11,500
	6	dsl	450	Wilson 75-P	900	10,000
Texland Drlg Co	4	dsl	1060	Unit U-15	720	9,000
V[illegible]na Drlg Co	10	dsl	700	M-CSCO U-36-A	600	12,000
	1	dsl	500	Brewster N-55	600	12,000
	2	dsl	550	Brewster N-55	600	12,500
	3	dsl	300	Brewster N-45	450	6,500
	4	dsl	500	Brewster N-4	400	6,500
	5	dsl	500	Wilson Mogul	400	6,500
	6	dsl	550	Brewster N-55	600	9,000
	7	dsl	700	Wilson Giant Roadair	600	9,000
HOPKINS						
Maxwell Herring Drlg Corp	18	dsl	3250	Gardner-Denver	2700	23,000
HOUSTON						
Delta Drlg Co	5	dsl	2000	National 100	1560	16,000
	54	dsl	2000	National 80-B	1560	14,000
Guffey-Schlensker Drlg Corp	3	dsl	1270	National 75-CA	1270	14,000
Justiss-Mears Oil Co Inc	32	gas-btne	700	Bethlehem 450	900	12,000
Loffland Bros Co	112	dsl-elec	3300	M-CSCO U-1220-EB	2200	30,000
Noble Drlg Corp	23	dsl	2600	National 1320-DE	2000	22,000
HOWARD						
D B Drlg Corp	8	dsl	830	Bethlehem S-55	700	10,000
Fiscus Drlg Inc	1	dsl	200	Wilson Super 36-5	200	3,200/4"
Gene Sledge Drlg Corp	3	gas	650	National 50-A	850	12,500
MGF Drlg Co-Midland	2	dsl	800	M-CSCO U-15	800	10,000
Moran Drlg Corp	53	dsl	600	Wilson Super 38	350	5,000
	57	dsl	600	Wilson Super 38	350	5,000
Riley Drlg	2	dsl	300	National	300	4,500
Robinson Drlg of Texas Inc	3	dsl	750	M-CSCO U-15	900	10,000
HUNT						
Rotary Drlg Inc	2	dsl	850	Spencer Harris 7000	700	10,600/4"
HUTCHINSON						
Service Drlg Co	1	dsl	320	M-CSCO U-34	310	4,500
IRION						
Frank Caraway Drlg Co	2	dsl	1300	Emsco GB-350	750	8,500
FWA Drlg Co Inc	12	dsl	1000	Wilson Giant	800	10,000
Sweetwater Drlg Co Inc	5	dsl	950	M-CSCO U-15	950	11,500
Texland Drlg Corp	1	dsl	675	Brewster N-4	420	7,100
Transcontinental Drlg Co Inc	34	dsl	675	Bethlehem S-55	650	8,000
Tucker Drlg Co Inc	1	dsl	750	Brewster N-55	750	10,000
	8	dsl	550	Ideco H-40	550	9,000
Wes-Tex Drlg Co	7	dsl	335	Brewster N-4	450	8,000
JACK						
Burns L D Drlg Co	2	dsl	1220	Wilson 75	600	10,000
Felderhoff Bros Drlg Co	2	dsl	800	Giant	600	9,000
Lin-Mour Drlg Corp	8	gas	400	Emsco G-42	400	6,500
MND Drlg Corp	57	dsl	500	National Ideal 50	500	6,000
Texland Drlg Corp	6	dsl	600	National T-12	380	6,000
Tierra Drlg Corp	4	dsl	500	National T-12	500	6,000
JACKSON						
FWA Drlg Co inc	18	dsl	500	Wilson Mogul 42	500	6,500
G-E Drlg Inc	8	dsl	500	Ideco H-400-B	500	8,000
JASPER						
Helmerich & Payne Intl Drlg Co	83	scr	2000	OILWELL E-2000	1400	30,000

TEXAS (Cont'd)

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
JEFFERSON						
Atco Drlg Inc (Southern)	7	dsl	800	Ideco Super 750	800	10,500
Gopher Drlg Co	7	dsl	150	Franks	100	4,000
Loffland Bros Co	77	dsl	1450	National 100	1575	17,000
O'Connor & Young Drlg Co	202	dsl-elec	2600	Brewster NE-95	1750	18,000
Resource Drlg Inc	15	dsl	1560	National 80-B	1835	14,000
Richards Operating Co	3	dsl	1800	Brewster N-75	1200	12,500
JIM WELLS						
Corpus Christi Drlg Co	5	dsl	300	Wilson Super 38	250	6,000/3½"
Dixilyn Field Drlg Co	4	dsl	2600	National 1625-M	3105	30,000
	1	dsl	1300	Brewster N-75	1000	12,000
	10	dsl	1295	National 55	1040	12,000
	19	dsl	1925	National 130	2331	20,000
	2	dsl	1300	National 610	1040	12,000
	20	dsl	1500	Brewster N-75	1040	12,000
	3	dsl	1300	Brewster N-75	1020	12,000
	5	dsl	1850	National 110	1638	18,000
	6	dsl	2000	Unit 914-B	1536	20,000
	7	dsl	850	National T-32	700	8,500
	9	dsl	2650	National 130	2331	25,000
	11	dsl	2600	National 110-M	2331	18,000
	12	dsl	2600	National 110-M	2331	18,000
	23	dsl	2800	OILWELL 860	2331	18,000
	24	dsl	2500	OILWELL 860	2331	18,000
	8	dsl	1950	National 110	1638	16,000
Field Drlg Co	18	dsl	1925	M-CSCO U-914-C	2331	20,000
T & T Drlg Co Inc	4	dsl	450	Cardwell	250	6,500
Pearl Expl Inc	1	dsl	800	Model 65	400	7,000
Torreon Drlg Co Inc	R-3	dsl	300	Ideco H-30	250	6,500
JONES						
F-W Drlg Co	5	dsl	420	Ideco H-25	375	5,500/4"
Mesa Drlg Co Inc	1	dsl	300	Ideco	400	7,000
Safari Drlg Corp	3	dsl	340	Brewster N-4	300	7,000
Tri-J Drlg Co	1	dsl	325	Wichtex R-5	250	3,000
KARNES						
Crawford Drlg Co	7	dsl	600	M-CSCO U-15	800	10,000
Harkins & Co	2	dsl	1500	Brewster N-95	1500	14,000
T & T Drlg Co Inc	1	dsl	1200	Cardwell KB-250	550	9,000
Southland Drlg Co Inc	10	dsl	1800	Bethlehem 810	1600	17,000
KAUFMAN						
Cape Drlg Co	2	dsl	600	Wilson 42 Mogul	500	8,000
Ironwood Drlg Inc	1	dsl	750	Emsco GC-350	750	9,000
Maxwell Herring Drlg Corp	2	dsl	1034	Bethlehem M-810	926	12,000
KENEDY						
Fournoy Drlg Co	10		1250	Skytop/Brewster N-46	820	12,500
Harkins & Co	10	dsl	1620	Emsco B-1013	1620	16,000
KING						
Herb Expl Co	1	btne		Failing 1500		1,500/2⅞"
Jack E Bearden Drlg Co	4	dsl	600	Wilson Mogul	400	7,000/4"
Wes-Mar Drlg Inc	5	gas-btne	465	M-CSCO U-15	290	7,500
KLEBERG						
Flournoy Drlg Co	5	dsl	1200	Franks Rocket 1000	950	12,000
Pool Well Serv Co	114	dsl	350	Wilson Mogul 42 Double Drum	500	5,500
Southland Drlg Co Inc	8	dsl	700	Emsco GB-350	700	8,000
KNOX						
Bearden Jack E Drlg Co	7	dsl	1200	Wilson Mogul	400	7,000/4"
GCO Drlg Co	1	dsl	640	National T-20	450	7,500
Sojourner Drlg Corp	3	dsl		M-CSCO U-15	550	7,000
LA SALLE						
Blocker Drlg Co	16	dsl	1080	Cabot Explorer III 1000 Series	950	12,000
Cactus Drlg Co	61	dsl	502	National T-20	460	6,000
Rhodes & Hicks Drlg Co	5	dsl	1000	Franks Cabot 700	750	7,500
	5	dsl	1000	Franks Cabot 700	500	7,000
LAMB						
Norton Drlg Co	7	dsl	450	Wilson 65	600	8,500
LAVACA						
Billings Oil Serv Inc	2	dsl	500	Skytop/Brewster H-4210	400	7,500
Buzzini Drlg Co	8	dsl	3600	OILWELL M-2000	2400	25,000
FWA Drlg Co Inc	29	dsl	1800	National 110	1800	18,000
Howell Drlg Inc	1	dsl	856	Cabot 900	900	11,000
	2	dsl	1300	Cabot 1200	1130	15,000
Loffland Bros Co	107	dsl	2160	Brewster N-12	2400	19,500
Richards-Armstrong Inc	6	dsl	2500	OILWELL 860	2400	18,000
LEE						
Atco Drlg Inc (Southern)	16	dsl	1126	Ideco H-525	800	8,500
	21	dsl	1080	Gardner-Denver 500	580	9,500
Butler Drlg Corp	7	gas	950	Brewster N-45	500	10,000
Cape Drlg Co	6	dsl	1000	Wilson Super Giant	800	11,500
Delta Drlg Co	80	dsl	1300	Spencer 7000	480	9,000
E W Moran Drlg Co	19	dsl	1200	Wilson 75	900	10,500
Economy Drlg Co	2	dsl	700	Bethlehem	800	8,000
MGF Drlg Co-Midland	6	dsl	750	National T-32	750	9,000
	8	dsl	800	M-CSCO Rig U-15	800	10,000
Resource Drlg Inc	18	dsl	1040	National 610	1220	12,000
LEE (Contd)						
Southland Drlg Co Inc	6	dsl	600	Howard Turner 1887-600-TD	600	8,500
	9	dsl	600	Brewster N-45	600	7,500
Texas Drlg Co	4	dsl	1300	National 50-CA	1455	12,500
Tom Brown Inc	13	dsl	750	M-CSCO U-15	750	10,000
LEON						
Cape Drlg Co	1	dsl	650	Wilson 42 Mogul	500	8,500
Cliffs Drlg Co	29	dsl	1300	National 110	1300	20,000
Delta Drlg Co	6	dsl	2300	Emsco C-1	2592	22,000
Nicklos Drlg Co	28	dsl-elec	3000	Emsco Electrohoist III	3600	25,000
O'Connor & Young Drlg Co	151	dsl-elec	2000	Brewster NE-95	1750	16,000
W B Hinton Drlg Co Inc	4	dsl	800	Spencer 7000	400	8,300
LIBERTY						
Butler Drlg Corp	5	dsl	1650	Brewster N-95	1650	18,000
	6	dsl	1100	Gardner-Denver 500	600	10,500
LIMESTONE						
Delta Drlg Co	21	dsl	2300	Gardner-Denver 1100	1560	17,000
FWA Drlg Co Inc	20	dsl	1600	Wilson Super Atlas	1000	13,000
Justin-Mears Oil Co	36	dsl	1000	1013	1200	16,000
MGF Drlg Co	38	dsl	1800	Continental Emsco Model C-1	1800	17,000
O'Neal Drlg Co	14	dsl	15000	National 80-B	1500	15,000
LIPSCOMB						
Baker & Taylor Drlg Co	10	dsl	870	M-CSCO U-15	870	11,000
E W Moran Drlg Co Inc	7	dsl	1200	Gardner-Denver 700	800	12,500
Leonard Hudson Drlg Co Inc	1	dsl	550	M-CSCO U-15	900	11,000
	3	dsl	500	M-CSCO U-15	900	11,000
	5	dsl	500	M-CSCO U-15	900	11,000
	6	dsl	550	Brewster N-7	900	11,500
	7	dsl	550	M-CSCO U-15	900	11,500
Mercury Drlg Co	11	dsl	750	Emsco U-15	900	9,000
Midco Drlg Inc	2		750	Unit U-15	750	12,500
Moran Drlg Corp	64	dsl	1000	Emsco GA-500	750	10,000
Search Drlg Co	2	dsl	950	Ideco H-725-C	950	9,500
Service Drlg Co	12	dsl	800	Emsco D-2	900	12,000
Sharp Drlg Co Inc	38	dsl	1450	Bethlehem M-58	988	12,000
Unit Drlg & Expl Co	12	dsl	1350	Gardner-Denver 1500	2000	25,000
	8	dsl	700	National 55	1588	14,000
	16	dsl	1000	Emsco WS-18	950	12,000
LIVE OAK						
Billings Oil Serv Inc	4	dsl	500	Skytop/Brewster H-4210	400	7,500
Blocker Drlg Co	8	dsl	1900	Cabot Expl 111 1200	1165	14,000
Flournoy Drlg Co	8	dsl	800	Ideco BIR-800	950	10,000
FWA Drlg Co Inc	24	dsl	1350	Wilson Mogul 42	800	11,000
Loffland Bros Co	88	dsl-elec	2160	M-CSCO U-712	2400	18,000
New & Hughes Drlg Co Inc	11	dsl	900	Emsco GA-500	600	11,500
Resource Drlg Inc	14	dsl	2330	National 110	2740	18,000
	19-RD	dsl	1040	National 610	1220	12,000
	7	dsl	1560	National 80-B	1835	14,000
South Texas Drlg Co	4	dsl	500	Skytop/Brewster 1046	750	10,000
LOVING						
Ard Drlg Co	8	dsl	1900	Emsco 800-GB	1800	16,000
Hillin Drlg Co Inc	3	dsl	500	BDW 450-T	575	7,500
MGF Drlg Co-Midland	202	dsl	1600	2000	2000	30,000
	201	dsl	1600	National U-E	2000	30,000
Parker Drlg Co	198	gas	1600	OIME 1500	1600	22,000
	58	dsl	1650	National 100-M	1650	20,000
	74	gas	1800	National 100-M	1800	22,000
Rowan Drlg U S	18	dsl	3200	Emsco A-1500	2500	30,000
	30	dsl	2600	Emsco A-1500	2400	22,000
Sharp Drlg Co Inc	43	dsl	2940	OILWELL M-2000	2742	30,000
	55	dsl	2970	Gardner-Denver 2100	2742	30,000
	61	dsl	2600	M-CSCO U-914-C	2742	20,000
	66	dsl-elec	2600	M-CSCO U-1220-E	2742	30,000
LUBBOCK						
D B Drlg Corp	3	dsl	675	Brewster N-4	420	7,000
Megargel Drlg Co	4	dsl	350	S-45-B Bethlehem Double Jacknife	275	5,370
Norton Drlg Co	5	dsl	500	Wilson 75	900	10,500
Sitton Drlg Co	1	dsl	450	Wilson 600	525	6,500
LYNN						
Tom Brown Inc	24	dsl	1100	Gardner-Denver 700	1100	14,500
MADISON						
Rotary Drlg Inc	4	dsl	850	Spencer-Harris 7000	700	10,600/4"
Tom Brown Inc	8	dsl	750	National 50-CA	750	10,000
MARION						
Maxwell Herring Drlg Corp	14	dsl	1000	Wilson Giant	900	12,000

TEXAS (Cont'd)

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
MARION						
Maxwell Herring Drlg Corp	14	dsl	1000	Wilson Giant	900	12,000
MARTIN						
Cactus Drlg Corp	24	dsl	1000	National 75	1476	13,000
	4	dsl	1200	National 55	1400	14,000
FWA Drlg Co Inc	11	dsl	1000	Wilson Giant	800	10,000
	2	dsl	1200	Wilson Super Giant	1050	13,000
Holliday Drlg Inc	2	dsl	700	OILWELL 76	1200	14,000
Kenai Drlg of Texas Inc	20	dsl	410	Emsco GB-250	400	6,000/4"
	20	dsl	500	Emsco GB-250	400	6,500
MGF Drlg Co-Midland	10	dsl	750	Bethlehem M-58	750	12,000
	11	dsl	800	Bethlehem M-58	800	12,500
	9	dsl	850	Emsco GC-500	850	14,000
Sterling Drlg Co	17	dsl	1500	Brewster N-75	1230	14,000
Tahoe Drlg Co	1	cat	500	National 50-A	900	11,500
Tom Brown Inc	5	dsl	750	National 50	750	10,500
Wes-Tex Drlg Co	3	dsl	700	National 50-A	700	10,000
MATAGORDA						
Delta Drlg Co	17	dsl-elec	2300	Emsco C-1	2592	16,000
FWA Co Inc	25	dsl	1350	Wilson 120	1350	16,000
Nicklos Drlg Co	23	dsl	1850	National 110	1755	18,000
O'Connor & Young Drlg Co	201	dsl-elec	2600	Brewster NE-95	1750	18,000
Richards Operating Co	8	dsl	2500	OILWELL 860	2400	18,000
Southland Drlg Co Inc	3	dsl	1300	Brewster N-75	750	11,000
T-L Drlg Co Inc	2	dsl	2000	Brewster N-75	1200	14,000
Welsh Drlg Serv & Inc	14	gas	1750	National 110-M	2550	16,000
MAVERICK						
Moran Drlg Corp	52	dsl	350	Wilson Super 38	350	5,000
	56	dsl	600	Wilson Super 38	350	5,000
MCMULLEN						
Atco Drlg Inc (Southern)	19	dsl	800	OILWELL 66	800	10,000
Delta Drlg Co	20	dsl-elec	2600	Emsco C-2	3456	20,000
Flournoy Drlg Co	4	dsl	900	Franks Explorer III	600	9,000/4"
Harkins & Co	9	dsl	2100	Emsco A-1100	2100	18,000/5"
MIDLAND						
FWA Drlg Co Inc	1	dsl	1000	Wilson Giant	800	10,000
Santa Fe Drlg Co (Western)	5	gas	2600	Bethlehem B-1013	2118	22,000
MITCHELL						
D B Drlg Corp	6	dsl	905	Brewster N-45	600	9,000
Riley Drlg Co	4	dsl	300	Franks	300	4,500
Wes-Tex Drlg Co	12	dsl	335	Brewster N-4	500	8,000
MONTAGUE						
Burns L D Drlg Co	1	dsl	1220	Bethlehem S-55	600	10,000
Lin-Mour Drlg Corp	21	btne-gas	650	Unit 15	650	7,500
MOORE						
Service Drlg Co	6	dsl	320	M-CSCO U-34	310	5,000
NACOGDOCHES						
Gibson Drlg Co	10	dsl	1200	Emsco D-2	1200	12,000
Globe Drlg Co Inc	7	dsl	1350	Gardner-Denver 1100	1500	20,000
Thunderbolt Drlg Inc	50	dsl	1750	Cabot 1200	1300	13,500
W B Hinton Drlg Co Inc	8	dsl	1300	Spencer 7000	400	9,500/4"
NAVARRO						
Atco Drlg Inc (Southern)	53	dsl	1200	National 610-UE	1200	12,000
Delta Drlg Co	64	dsl	1200	Emsco D-2	784	10,500
Schlensker Drlg Corp	3	dsl	700	OILWELL 760	1500	14,000
NEWTON						
Delta Drlg Co	90	dsl-elec	2592	Emsco D-3 Type II	2592	16,000
NOLAN						
F-W Drlg	7	dsl	500	Brewster N-4	450	7,500
GCO Drlg Co	2	dsl	640	Emsco 250-T	450	7,000
Mesa Drlg Co Inc	2	dsl	300	Weiss W-45	500	
NUECES						
Alanco Drlg Co	2	dsl	500	Ideco H-40	600	9,500
Blocker Drlg Co	6	dsl	1300	Cabot HT Explorer Rocket 900	950	10,000
Delta Drlg Co	94	dsl-scr	2000	Emsco D-3	2592	16,000
F-W Drlg Co	10	dsl	1000	Ideco H-1200	1000	16,000
Flournoy Drlg Co	2	dsl	800	Emsco C-50	480	9,000/4"
	3	dsl	1560	M-CSCO U-40	1040	12,000
Harkins & Co	14	dsl	750	Cabot Series 900	900	11,000/4"
	6	dsl	1260	Brewster N-75-A	1260	12,500
Matagorda Drlg Co	12	dsl	2000	National 80-B	1500	15,000
	14	dsl	2600	National 110	2000	18,000
	15	dsl	2000	National 80-B	1500	15,000
PRC Drlg Co	5	dsl	1198	Gardner-Denver 700-M	800	13,000
	7	dsl	1700	Gardner-Denver 800-M	1040	16,000
OCHILTREE						
Baker & Taylor Drlg Co	12	dsl	870	M-CSCO U-15	870	11,000
Midco Drlg Inc	1	dsl	680	Unit U-15	680	9,000
Service Drlg Co	4	dsl	500	M-CSCO U-15	800	9,200
Zenith Drlg Corp Inc	1	dsl	600	Emsco GB-350	600	8,500
	4	dsl	1100	Unit U-15	1100	12,000
OLDHAM						
Baker & Taylor Drlg Co	1	dsl	870	A-CSCO U-15	870	10,000

TEXAS (Cont'd)

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
PALO PINTO						
Lin-Mour Drlg Corp	4	gas	400	Wilson Mogul	310	5,000
Megargel Drlg Co	6	dsl	350	Bethlehem S-45-B	275	6,000
Oilwell Drlg Inc	2	dsl	476	Bethlehem S-50	476	5,500
PANOLA						
Burris Drlg Co	104	dsl	800	Emsco 350	500	10,000
	107	dsl	1000	Brewster N-55	750	10,000
Don Lester Drlg Co Inc	6	dsl	2000	Wilson 150-A	1800	16,000
Delta Drlg Co	40	dsl	1500	Emsco D-2	784	11,000
	74	dsl	1100	Spencer 7000	480	9,000/4"
Gibson Drlg Co	2	dsl	526	Wilson Mogul 65	398	5,000
	9	dsl	1030	Wilson Mogul 75-P	700	9,000
Murco Drlg Corp	38	dsl-elec	1700	OILWELL 660-E	700	12,000
Paramount Drlg Co Inc	11	dsl	1700	Bethlehem 450	1200	12,500
Transcontinental Drlg Co Inc	23	dsl	1000	Brewster N-75	1000	12,000
	27	dsl	750	Brewster N-7	750	11,500
	35	dsl	1200	Gardner-Denver 800-M	1200	16,000
Wheless Drlg Co	4	dsl	1800	Emsco J-1100	1800	16,000
PARKER						
Crawford Drlg Co	3	dsl	350	Wilson Giant	350	6,500
D B Drlg Corp	4	dsl	675	National T-12	460	6,000
MND Drlg Corp	1359	gas	450	Emsco 350	450	6,000
Wes-Mor Drlg Inc	7	dsl	680	M-CSCO U-34	680	7,500
Wes-Tex Drlg Co	16	dsl	335	Brewster N-4	500	8,000
PECOS						
A N Norwood Inc	1	dsl	450	Wilson Super 38	350	5,500
	4	dsl	600	National T-20	450	6,000
Cactus Drlg Corp	1	dsl	1700	National 110	2145	18,000
Delta Drlg Co	36	dsl	2300	Emsco C-2 Type III	2331	23,000
Dual Drlg Co	19	dsl	2000	OILWELL 760	1000	16,000
FWA Drlg Co Inc	14	dsl	800	Wilson Mogul	600	7,000
Hillin Drlg Co Inc	9	dsl	600	Ideco H-40	600	7,500
Holliday Drlg Inc	1	dsl	700	Gardner-Denver 700	1000	12,000
Kenai Drlg of Texas Inc	28	dsl	900	Brewster N-7	1000	14,000
	28	dsl	750	Brewster N-7	1200	10,000
Loffland Bros Co	37	dsl-elec	2300	M-CSCO U-914-B	2000	18,000
Parker Drlg Co	121	dsl-elec	2700	Ideco E-3000	2700	30,000
	16	gas	1200	OILWELL 76	1200	16,000
	184	gas-elec	2750	National 1625-DE	2750	30,000
	39	gas	1700	OIME Hercules 2500-M	2000	23,000
	84	gas	750	National 75	750	10,000
	87	gas	2000	Ideco 2000	2000	25,000
	90	gas	2000	National 130	2000	25,000
Penrod Drlg Co	25	dsl	2600	Emsco C-2	1950	25,000
Rod Ric Corp	11	dsl	450	National T-20	440	5,000/4"
Santa Fe Drlg Co (Western)	14	dsl	3200	Emsco C-3-E	2000	30,000
	10	dsl-elec	2000	Emsco Electrohoist II	1800	22,000
	3	dsl-elec	2600	Emsco A-1500-E	2700	30,000
	7	dsl-elec	2600	Emsco C-111	2700	30,000
	8	dsl-elec	2600	Emsco A-1500-E	2700	30,000
Sharp Drlg Co Inc	60	dsl-elec	3200	Emsco C-3 Type II	3656	30,000
Tom Brown Inc	12	gas	680	National 50	680	10,000
POLK						
Butler Drlg Corp	3	dsl	1450	Brewster N-75	1100	12,500
Glasscock Drlg	67	dsl	2700	National 1320	2700	20,000
W B Hinton Drlg Co Inc	5	dsl	900	Spencer 7000	450	9,500/4"
REAGAN						
D B Drlg Corp	11	dsl	770	Unit U-34	360	7,000
FWA Drlg Co Inc	30	dsl	1000	Wilson Giant	800	10,000
	4	dsl	1000	Wilson Giant	800	10,000
Sterling Drlg Co	1	dsl	900	National 50-A	900	12,000
Texland Drlg Corp	3	dsl	715	Bethlehem S-45-E	600	9,000
Transcontinental Drlg Co Inc	33	dsl	898	Unit Rig U-15	650	8,500
REEVES						
Cactus Drlg Corp	31	dsl	2000	National 125	2810	25,000
Kenai Drlg of Texas Inc	11	dsl	400	National T-20	400	6,000
	11	dsl	400	National T-20	400	5,000
Sharp Drlg Co Inc	34	dsl	2925	Bethlehem 1013	2742	30,000
	59	dsl	2600	Bethlehem MC-950	2742	23,000
Tri-Service Drlg Co	10	dsl	1100	OILWELL 860	1800	21,000
REFUGIO						
Blocker Drlg Co	10	dsl	840	Ideco Hydrair H-37 ESC	430	7,500
Harkins & Co	12	dsl	1050	Cabot 750	650	9,500/4"
J & C Drlg Co	9	dsl	1050	Wilson 600	630	9,000
Padre Drlg Co Inc	3	dsl	700	Skytop/Brewster N-55	800	10,000
Rhodes & Hicks Drlg Co	6	dsl	1250	Franks Cabot 750	750	9,000
	6	dsl	1250	Franks Cabot 750	750	9,000
ROBERTS						
E W Moran Drlg Co Inc	13	dsl	1200	Gardner-Denver 700	1000	12,500
Leonard Hudson Drlg Co Inc	4	dsl	500	M-CSCO U-15	900	11,000
Moran Drlg Corp	4	dsl-elec	1400	Emsco A-800-WE	1800	15,000

TEXAS (Cont'd)

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
ROBERTS (Contd)						
Unit Drlg & Expl Co	20	dsl	1000	Gardner-Denver	1200	15,000
ROBERTSON						
Delta Drlg Co	15	dsl	1800	Emsco D-3	1040	12,500
RUNNELS						
C & H Drlg Co	2	dsl		Brewster N-4	375	6,000
Hack Drlg Co	2	dsl	350	Brewster N-4	350	5,500
Safari Drlg Corp	5	dsl	370	Emsco GA-250-T	280	5,000
RUSK						
Globe Drlg Co Inc	6	dsl	700	Emsco C-50	700	10,000
Ironwood Drlg Inc	2	dsl	1000	M-CSCO U-36-A	820	10,500
	3	dsl	700	National 50-CA	820	10,000
Justiss-Mears Oil Co Inc	21	dsl	800	Emsco GB-500	1000	12,000
	34	gas-btne	700	Bethlehem M-58	1000	12,000
	5	dsl	450	Bethlehem S-45-E	300	6,500
Mustang Drlg Corp	1	dsl	750	Emsco 500	750	12,000
	2	dsl	750	Emsco 500	750	12,000
Pool Well Serv Co	102	dsl	350	Wilson Mogul 42 Double Drum	500	5,500
	188	dsl	1000	Wilson 42	500	5,500
Rainbow Drlg Co Inc	3	dsl	1300	Cabot 900	950	11,000
The H & S Drlg Co	2	dsl	1700	Brewster N-95	2145	14,000
United Drlg Co of Tyler	1	dsl	960	Spencer Harris 7000	470	10,000/4"
	6	dsl	1200	Bethlehem M-58	800	13,000
	7	dsl	700	Wilson Torcair Giant	616	10,000
Woolf & Magee Inc	2	dsl	1550	Gardner-Denver 700	1000	13,500/4"
	3	dsl	1450	Gardner-Denver 700	1275	13,500/4"
SABINE						
Loffland Bros Co	203	dsl	1140	M-CSCO U-15	1000	11,500
SAN JACINTO						
Atco Drlg Inc (Southern)	52	dsl		M-CSCO		12,000
SCHLEICHER						
Frank Caraway Drlg Co	1	dsl	750	Emsco GB-250	570	7,500
Transcontinental Drlg Co Inc	30	dsl	1000	Brewster N-55	850	11,000
Tucker Drlg Co Inc	3	dsl	350	Brewster N-45	600	6,500
SCURRY						
GCO Drlg Co	6	dsl	620	Brewster N-45	600	8,000
Riley Drlg Co	3	dsl	300	M-CSCO U-34	225	4,000
Wes-Tex Drlg Co	5	dsl	550	National 50-A	700	10,000
SHACKELFORD						
Jones Drlg Co	51	dsl	475	Brewster N-4	475	6,000
	53	dsl	250	Houston Portable	220	3,000
	54	dsl	475	Bethlehem S-45	475	7,000
	55	dsl	500	Bethlehem S-45	475	8,500
Lowe Drlg Inc	6	dsl	475	M-CSCO U-34	475	6,000
Morrison Drlg & Prod Co Inc	101	dsl	450	National T-20	476	6,000
SHERMAN						
Service Drlg Co	7	dsl	320	Bethlehem S-45	310	5,000
SMITH						
Burris Drlg Co	108	dsl	1200	Wilson S-42	750	11,000
Gibson Drlg Co	11	dsl	1200	Emsco D-2	1200	12,000
	7	dsl	895	Emsco GB-350	660	8,500
Lanford Drlg Co Inc	9	dsl	300	Brewster	200	2,000
Rotary Drlg Inc	1	dsl	800	Emsco	700	10,500/4"
United Drlg Co of Tyler	2	dsl	1200	Bethlehem M-58	800	13,000
	9	dsl	1200	Bethlehem M-58	800	12,500
Verna Drlg Co	21	dsl	550	M-CSCO	600	10,000
	22	dsl	550	M-CSCO U-15	600	10,000
	23	dsl	550	M-CSCO U-15	600	10,000
	24	dsl	550	M-CSCO U-15	600	10,000
STARR						
Harkins & Co	5	dsl	900	Cabot 750	650	9,500/4"
Texas Drlg Co	1	dsl	1700	National 50-CA	1455	11,500
Willis Drlg Co Inc	3	dsl	1000	Brewster N-75	1000	12,000
STEPHENS						
E & H Drlg Co	2	dsl	400	M-CSCO U-34	325	6,000
Faulk Drlg Co	4	dsl	450	Brewster N-4	450	6,000
Tierra Drlg Corp	7	dsl	550	National T-12	550	5,400
	5	dsl	500	National T-12	500	6,000
Wes-Mor Drlg Co	6	gas-btne		M-CSCO U-34		4,500
	11	dsl		Wilson Roadair		6,000
STERLING						
Cam Drlg Inc	2	dsl	510	Bethlehem S-55	750	10,000
Cherokee Drlg & Dev Corp	4	gas	1150	Wilson 75	900	11,000
Kenai Drlg of Texas Inc	25	dsl	800	Emsco G-500	800	11,000
	25	dsl	700	Emsco GB-500	800	11,000/4"
Robinson Drlg of Texas Inc	2	dsl	750	M-CSCO U-15	900	10,000
Wes-Tex Drlg Co	1	dsl	650	National 50-A	650	10,000
STONEWALL						
Hack Drlg	4	dsl	225	National T-8	250	4,000
	1	dsl	350	M-CSCO U-34	350	7,000
Moran Drlg Corp	54	dsl	750	National T-20	400	5,000
Safari Drlg Corp	1	dsl	640	Unit U-15	640	10,000

TEXAS (Cont'd)

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
STONEWALL (Contd)						
Sojourner Drlg Corp	4	dsl		M-CSCO U-15	550	7,000
	5	dsl	250	M-CSCO U-15	550	7,000
Wes-Mor Drlg Inc	1	dsl		M-CSCO U-15		8,000
	12	dsl	2500	Unit U-15	2500	9,000
SUTTON						
Delta Drlg Co	2	dsl	1400	Gardner-Denver 700	784	12,500
	73	dsl	500	Spencer Port-A-Rig 7000	440	9,000
Tom Brown Inc	11	gas	480	M-CSCO U-15	480	8,000
	15	gas	680	M-CSCO U-15	680	10,000
Tucker Drlg Co Inc	4	dsl	214	M-CSCO U-15	450	7,500
Wes-Tex Drlg Co	10	dsl	300	Brewster N-4	500	8,000
	15	dsl	335	Brewster N-4	500	8,000
TARRANT						
I X Drlg Co Inc	1	dsl	950	Emsco G-500	950	8,500
	2	dsl	476	Emsco GA-250-T	476	6,000
	3	dsl	636	Bethlehem MC-450	636	85,000
	4	dsl	392	Wilson Mogul 42 Roadair	476	6,000
TAYLOR						
C & H Drlg Co	7	dsl		Wichtex	350	5,000
F-W Drlg Co	3	dsl	420	National T-12	400	47,504
TERRELL						
Delta Drlg Co	61	dsl	1320	Ideco Super 7-11	1040	12,500
Rowan Drlg U S	12	dsl	2000	National 1320-M	2100	18,000
Sitton Drlg Co	4	dsl	450	Wilson 75-P	900	10,000
TERRY						
Brahaney Drlg Co Inc	4	gas	1200	Emsco J-1000	1200	15,000
GCO Drlg Co	5	dsl	820	M-CSCO U-15	850	10,000
Norton Drlg Co	2	dsl	450	Wilson Mogul 42	650	7,000
Sitton Drlg Co	2	dsl	650	Wilson 75-P	900	11,500
Tri-Service Drlg Co	6	gas	850	OILWELL 96	1350	16,000
Willbaos Drlg Inc	4	dsl	1700	National 55	1260	14,000
THROCKMORTON						
Carter Dev Corp	2	dsl	300	Wilson Mogul	300	7,000
E & H Drlg Co	5	LPG	550	Wilson Giant	550	7,500
Lowe Drlg Co	2	dsl	475	M-CSCO U-34	475	6,000
Megargel Drlg Co	8	btne	500	Unit U-15 Double Jacknife	500	7,000
Oilwell Drlg Inc	5	dsl	476	Wilson Mogul	476	5,500
	6		476	Wilson Super	476	5,500
Tierra Drlg Corp	1	dsl	650	Bethlehem S-45	650	7,000
TOM GREEN						
D B Drlg Corp	10	dsl	530	Brewster N-4	630	5,[illegible]00
Frank Caraway Drlg Co	3	dsl	550	Bethlehem S-50	375	6,000
TRINITY						
Parker Drlg Co	161	gas	1200	National 75	1200	16,000
TYLER						
Delta Drlg Co	22	dsl	1500	Emsco D-3	1560	12,500
Lanford Drlg Co Inc	6	dsl	300	Brewster	200	1,500
Murco Drlg Corp	42	dsl-elec	2800	OILWELL E-2000	2000	25,000
UNDER CONSTRUCTION						
Resource Drlg Inc	RD-21	dsl	2330	National 110	2740	18,000
	RD-22	dsl	3105	National 1320	3740	25,000
	RD-23	dsl	1040	National 610	1220	12,000
	RD-24	dsl	2330	National 110	2740	18,000
	RD-25	dsl	1560	National 80-B	1835	14,000
	RD-26	dsl	1560	National 80-B	1835	14,000
	RD-27	dsl	1560	National 80-B	1835	14,000
	PD-28	dsl	1040	National 610	1220	12,000
	RD-30	dsl	3105	National 1625	3740	30,000
	R-29	dsl	1560	National 80-B	1835	14,000
	RD-20	dsl	1040	National 610	1220	12,000
UPSHUR						
Burris Drlg Co	109	dsl	1200	Emsco GC-50-C	750	13,000
	110	dsl	1200	Gardner-Denver 700	750	13,000
Butler-Johnson Inc	3	gas-btne	1200	Emsco A-550	1200	13,500
Dan Lester Drlg Co Inc	8	dsl	1850	OILWELL 760	1500	16,000
	9	dsl	2000	OILWELL 760	1500	16,000
Justiss-Mears Oil Co Inc	27	dsl	700	Bethlehem MC-450	900	12,000
Maxwell Herring Drlg Corp	3	dsl	1000	Wilson Atlas	1000	12,000
UPTON						
Cactus Drlg Corp	14	dsl	850	OILWELL 66	942	11,000
FWA Drlg Co Inc	17	dsl	1000	Wilson Giant	800	10,000
	3	dsl	1200	Wilson Super Giant	1050	13,000
	8	dsl	1000	Wilson Giant	800	10,000
Tom Brown Inc	4	dsl	840	National 50-CA	840	9,500
VAL VERDE						
Delta Drlg Co	4	dsl	2150	National 100	1560	16,000
VAN ZANDT						
Discovery Drlg Inc	1	dsl	3000	National 100	3000	17,500
Thunderbolt Drlg Inc	51	dsl	2600	National 100-TC	2586	20,000
VICTORIA						
T & T Drlg Co Inc	3	dsl	450	National	450	6,500

TEXAS (Cont'd)

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwks	Rated Depth with 4½" Pipe
VICTORIA (Contd)						
PRC Drlg Co	6	dsl	1790	Skytop/Brewster N-75	1040	13,000
Resource Drlg Inc	17	dsl	1560	National 80-B	1835	12,000
	5	dsl	2330	National 110	2740	18,000
Richards Operating Co	5	gas-btne	1200	Brewster N-75	900	12,500
WALLER						
Drillers Inc	10	dsl	1800	National 100-M	1800	18,000
Eagle Prod & Drlg Serv Inc	1	dsl-elec	2000	OILWELL 840-E	3300	20,000
WARD						
A N Norwood Inc	3	gas	1000	Brewster N-4	450	6,000
Hillin Drlg Co Inc	2	dsl	800	Emsco G-500	800	11,000
John Drlg Co	4	dsl	700	M-CSCO U-15	700	8,500
	5	dsl	700	M-CSCO U-15	700	8,500
Kenai Drlg of Texas Inc	13	dsl	400	Emsco GA-250	400	6,500
	13	dsl	400	Emsco GA-250-T	400	6,500
Moran Drlg Corp	39	dsl-elec	2000	M-CSCO C-1	1500	20,000
Parker Drlg Co	85	gas	2000	National 130	2000	23,000
Rod Ric Corp	9	dsl	750	Ideco H-35	600	8,000/4"
Rowan Drlg U S	8	dsl	2600	M-CSCO U-1220-S	2400	25,000
Santa Fe Drlg Co (Western)	4	dsl-elec	2600	Emsco C-111-E	2700	30,000
WASHINGTON						
T-L Drlg Co Inc	10	dsl	2000	Brewster N-75	1200	12,500
Tierra Drlg Corp	11	dsl	650	BDW 650	700	12,000
WEBB						
Atco Drlg Inc (Southern)	57	dsl	1200	National 610-UE	1800	12,000
Blocker Drlg Co	12	dsl	2000	OILWELL 96	2400	20,000
Delta Drlg Co	63	dsl-elec	2300	Emsco C-1 Type 11-E	2592	16,000
	89	dsl-scr	2000	Emsco D-3	2592	16,000
Dixon Drlg Co	12	dsl	300	Brewster N-4	300	7,000
	9	dsl	500	Spencer 5000 Port	300	6,000
Harkins & Co	11	dsl	1260	Skytop/Brewster N-75	1260	12,500
Jack E Bearden Drlg Co	3	dsl	1200	Wilson Mogul	600	9,000
Resource Drlg Inc	4	dsl	1560	National 80-B	1835	14,000
Southland Drlg Co Inc	12	dsl	2300	M-CSCO 1500-A	2300	24,000
	4	dsl	850	Brewster N-7	900	10,000
Texas Drlg Co	3	dsl	1700	National 50-A	1455	12,500
WHARTON						
Billings Oil Serv Inc	6	dsl	500	Skytop/Brewster H-4210	400	7,500
Burro Drlg Co Inc	1	dsl	500	Wilson Mogul 42	500	9,000
Louise Drlg Co Inc	1	dsl	2684	Ideco H-40	1006	10,000/3½"
PRC Drlg Co	1	dsl	800	Skytop/Brewster H-4610-A	500	8,000
WHEELER						
Baker & Taylor Drlg Co	14	dsl	1140	M-CSCO U-40	1140	18,000
	4	dsl	1140	M-CSCO U-20	1140	18,000
	5	dsl	1400	M-CSCO U-20	1400	22,000
Drillers Inc	40	dsl-elec	2100	Gardner-Denver 1100-E	2100	20
Helmerich & Payne Intl Drlg Co	47	dsl	2475	OILWELL H-2000	2475	26,000
Loffland Bros Co	222	dsl-elec	3300	M-CSCO U-1220-B	2200	28,000
Murco Drlg Corp	30	dsl	2800	OILWELL N-200-B	3000	25,000
Parker Drlg Co	59	gas	1650	OIME 1500-P	1650	18,000
Penrod Drlg Co	3	dsl		National 1320-M	3425	25,000
Sharp Drlg Co	52	dsl	1600	Bethlehem M-810	1836	19,000
Stahlco Drlg Co	1	dsl	510		475	5,000
	2	dsl	510	Ingersoll-Rand T-5	485	5,000
Unit Drlg & Expl Co	9	dsl	600	Brewster N-55	1050	10,000
WILBARGER						
Crawford Drlg Co	9	dsl	350	Wilson Roadaire	350	7,000
Lin-Mour Drlg Corp	31	gas	700	Wilson Giant	700	9,000
	31	gas	700	Wilson Giant	700	9,000
WILLACY						
Flournoy Drlg Co	6	dsl	800	Brewster N-45	600	9,000/4"
PRC Drlg Co	2	dsl	880	Unit 34	460	7,500/4"
Willis Drlg Co Inc	1	dsl	1000	Bethlehem B-Line MC-450	1000	12,000
WILSON						
Crawford Drlg Co	6	dsl	650	M-CSCO U-15	800	10,000
G-E Drlg Inc	2	dsl	500	Unit 34	500	6,700
WINKLER						
Ard Drlg Co	1	dsl	600	Spencer Harris	670	8,500
Brahaney Drlg Co Inc	6	gas	1200	National 100	1200	15,000
Cactus Drlg Corp	2	dsl	2000	Emsco A-1500	2976	23,000
	27	gas	2000	Brewster N-20	2976	30,000
John Drlg Co	10	dsl	900	OILWELL 66	900	10,000
Kenai Drlg of Texas Inc	17	dsl	410	Brewster N-4	450	6,500
	17	dsl	800	Brewster N-4	580	7,500
Moran Drlg Corp	51	dsl	750	Ideco H-30	350	6,000
Parker Drlg Co	65	gas	2000	National 100-M	2000	23,000
Santa Fe Drlg Co (Western)	6	dsl-elec	2600	Emsco C-111	2700	30,000
Sharp Drlg Co Inc	35	dsl	2600	Bethlehem 1013	2742	23,000
Sterling Drlg Co	16	dsl	1400	Brewster N-75	1230	14,500
WISE						
Crawford Drlg Co	1	dsl	350	M-CSCO U-15	600	8,500
	8	dsl	350	OILWELL 64-B	350	7,000
WISE (Contd)						
Lin-Mour Drlg Corp	2	gas	380	Emsco G-350	380	6,500
Luke Grace Drlg Co	2	dsl	500	M-CSCO U-15	750	10,500
M N D Drlg Corp	5001363	dsl	800	M-CSCO U-15	800	9,500
	5001364	dsl	800	M-CSCO U-15	800	9,500
	51	dsl	550	National 50	550	7,000
	52	dsl	550	National 50	550	7,000
	53	dsl	600	M-CSCO U-15	600	9,000
	54	dsl	600	M-CSCO U-15	600	9,000
	55	dsl	600	M-CSCO U-15	600	9,000
	60	dsl	800	M-CSCO U-15	800	9,500
	62	dsl	600	M-CSCO U-15	600	9,000
Wes-Mor Drlg Inc	10	dsl		M-CSCO U-15		7,500
	8	gas-btne		M-CSCO U-15		6,500
WOOD						
Gibson Drlg Co	1	dsl	606	Wilson Mogul 42	398	5,000
Justiss-Mears Oil Co Inc	28	dsl	700	OILWELL 96	1000	15,000
	30	dsl	1000	Bethlehem 1013	1400	17,000
Maxwell Herring Drlg Corp	15	dsl	1200	Spencer Harris	400	10,000
W B Hinton Drlg Co Inc	9	dsl-elec	2600	National 110-UE	3000	20,000
YOAKUM						
Cherokee Drlg & Dev Corp	2	dsl	1150	Wilson 75	900	1,100
D B Drlg Corp	9	dsl	830	Unit U-34	530	7,000
Megargel Drlg Co	10	dsl	750	Unit Double Jacknife U-15	750	7,000
	2	dsl	750	Unit U-15 Double Jacknife	750	7,000
Moranco	6	dsl	750	Brewster N-75	750	12,000
Norton Drlg Co	3	dsl	500	Wilson 75	900	10,500
Sterling Drlg Co	7	dsl	850	National 50-A .	900	12,000
YOUNG						
E & H Drlg Co	1	dsl	700	M-CSCO U-15	700	7,500
	4	LPG	550	M-CSCO U-15	550	7,500
	6	dsl	600	Wilson Mogul	350	6,500
Franklin Drlg Inc	1	dsl	300	Gardner-Denver 1500	300	1,500/3½"
	2	dsl	400	Gardner-Denver Inc	400	2,500/3½"
Lin-Mour Drlg Corp	5	dsl	750	Emsco G-42	750	7,000
Luke Grace Drlg Co Inc	3	dsl	500	Cardwell Model S	450	6,400
Tierra Drlg Corp	3	dsl	650	Wilson Torqaia	650	7,000
Wes-Mor Drlg Inc	2	dsl		M-CSCO U-34		6,000
ZAPATA						
Atco Drlg Inc (Southern)	50	dsl	1560	National 100-HD	1560	14,000
New & Hughes Drlg Co Inc	10	dsl	900	Emsco GB-500	600	11,500
South Texas Drlg Co	1	dsl	500	Brewster N-45	500	8,000
Southland Drlg Co Inc	2	dsl	1300	Brewster 75-A	1150	12,000
Texas Drlg Co	2	dsl	1700	Brewster N-7	1200	12,500
ZAVALA						
Dixon Drlg Co	11	dsl	300	National T-20	300	7,500
Sundown Drlg Co	2	dsl	400	Brewster N-35	350	5,500

UTAH

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwks	Rated Depth with 4½" Pipe
BEAVER						
Verna Drlg Co	8	dsl	500	Ideco H-40	400	6,500
	9	dsl	600	Ideco H-40	450	6,500
CARBON						
Westburne Drlg Inc	52	dsl	1650	National Ideal 110	1830	18,000/5"
DUCHESNE						
Loffland Bros Co	163	dsl	1260	National 80-B	1500	16,000
TWT Expl Inc	4	dsl	300	National T-10	300	4,000
	5	dsl	880	Model O Cardwell	880	10,000
Viersen & Cochran Drlg Co	7	dsl	1700	M-CSCO U-712-A	1554	18,000
GARFIELD						
Brinkerhoff-Signal Inc	15	dsl	2000	Gardner-Denver 1500	2000	20,000
Veco Drlg Inc	3	dsl	850	M-CSCO	700	9,000
	3	dsl	850	M-CSCO	700	9,000
GRAND						
Atco Drlg Inc	5	dsl	326	National T-32	326	8,000/4"
Cactus Drlg Corp	5	dsl	1000	National 75	1180	12,000
Cardinal Drlg Co	4	dsl	560	National T-32	440	6,000/½"
Kenai Drlg Rocky Mountain Inc	3	dsl	1400	OILWELL 52-T	700	9,500
Nicor Drlg Co	38	dsl	900	Wilson 75	900	10,000
Veco Drlg	6	dsl	1400	OIME 750	750	11,000
JUAB						
Penrod Drlg Co	102	dsl	1600	National 610-M	964	16,000
	20	dsl	2600	National 1320-M	1950	25,000
MILLARD						
Loffland Bros Co	58	dsl-elec	2000	National 80-B	2000	18,000
Penrod Drlg Co	23	dsl	2600	National	1950	25,000
RICH						
Parker Drlg Co	118	dsl	2000	National 100-M	2700	20,000

UTAH(Cont'd)

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
RICH (Contd)						
True Drlg Co	20	dsl	2100	National 125	2100	20,000
Viersen & Cochran Drlg Co	9	dsl	2150	National 110	2400	20,000
SAN JUAN						
All Western Drlg	2	gas	700	Emsco U-15	700	10,000
Brinkerhoff-Signal Inc	9	dsl	700	Brewster N-45	600	7,500
Loffland Bros Co	211	dsl	1260	M-CSCO U-15	1000	10,000
Mesa Drillers	1	dsl	600	National 50-A	750	8,000
Tierra Drlg Corp	6	dsl	850	Brewster	800	8,000
SEVIER						
Loffland Bros Co	98	dsl-elec	1400	M-CSCO U-40-E	1600	13,000
SUMMIT						
Brinkerhoff Drlg Co Inc	40	dsl	2400	National 130	2400	22,000
Brinkerhoff-Signal Inc	8	NGB	900	M-CSCO U-40	900	11,000
Dixilyn-Field Drlg Co	35	dsl	1600	National 80-UE	1800	15,000
	36	dsl	2000	National 110-UE	2000	18,000
Exeter Drlg Northern Inc	29	dsl	1200	Gardner-Denver 800	1200	15,000
Parker Drlg Co	116	dsl-elec	2000	National 80-B	2750	20,000
	117	gas	2000	National 110	2700	22,000
	183	dsl	1650	OIME 1500-P	1650	20,000
	56	dsl	1200	National 50-A	1800	11,000
R L Manning Co	32	dsl-elec	2000	Emsco D-3	1000	16,500
Viersen & Cochran Drlg Co	11	dsl	2600	National 110	2400	20,000
TOOELE						
TWT Expl Inc	2	dsl	200	Gardner-Denver 15-W	200	2,000
UINTAH						
All Western Drlg	1	dsl	1200	Schramm		1,500
Carmack Drlg Co	5	dsl	1000	Franks 400	430	5,000
Loffland Bros Co	23	dsl	1260	M-CSCO U-15	1000	9,000
WASATCH						
Loffland Bros Co	1	dsl	1290	M-CSCO U-40	1440	13,000

VIRGINIA

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
DICKENSON						
Union Drlg Inc	4	dsl		Spencer Harris 6000	380	6,000

WASHINGTON

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
KITTITAS						
Brinkerhoff Drlg Co Inc	53	dsl-elec	2325	National 100	2325	18,000
LEWIS						
Taylor Drlg Co	5	prop	350	M-CSCO U-34	225	4,000

WEST VIRGINIA

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
UNDESIGNATED						
Challenger Drlg	16-S	dsl-elec	600	Emsco G-[illegible]	750	2,000/9⅝"
BARBOUR						
Ray Resources	3	dsl	1000	Ideco BIR-5525	600	5,500
Union Drlg Inc	6	dsl		Skytop/Brewster N-55	430	6,000
CLAY						
Smith Drlg Co Inc	10	dsl	350	Challenger M-320	360	5,000/3½"
DODDRIDGE						
Union Drlg Inc	5	dsl		Cardwell 350	380	5,000
FAYETTE						
Smith Drlg Co Inc	8	dsl	350	Challenger M-2-80	360	4,500/3½"
LEWIS						
Delta Drlg Co	67	dsl		Spencer 7000	480	9,000
Union Drlg Inc	1	dsl		Ideco H-35	380	5,000
	2	dsl		Cabot Franks 658	290	4,000
	8	dsl		Ideco H-35	350	5,000
	9	dsl	425	Cabot Franks 74053-6	425	6,500
MINERAL						
Delta Drlg Co	84	dsl	1800	Emsco D-3 Type 3	1560	16,000
PRESTON						
Ray Resources	8	dsl	1000	Brewster N-55	800	10,000
PUTNAM						
FWA Drlg Co Inc	15	dsl	350	Wilson 38	350	4,500
	23	dsl	375	Wilson Super 38	400	6,000
Ray Resources	4	dsl	1000	Ideco BIR-5525	600	5,500
RALEIGH						
Ray Resources	9	dsl	1000	Ideco H-35	400	6,000
ROANE						
FWA Drlg Co Inc	13	dsl	375	Wilson Super 38	350	4,500
UPSHUR						
Union Drlg Inc	3	dsl		Ideco 650	380	6,500
	7	dsl		Spencer Harris	350	5,000
WOOD						
Ray Resources	6	dsl	1000	Ideco DIR-7015		8,500

WYOMING

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
UNDESIGNATED						
Brinkerhoff Drlg Co Inc	38	dsl	350	Brewster N-4	312	5,000
Loffland Bros Co	325	dsl	2160	Gardner-Denver 2100	2400	25,000
	119	dsl-elec	4200	Emsco CE-3000 Type 2	3000	32,000
Shelby Drlg Inc	51-E	dsl-elec	1000	Ideco 725-E	750	10,000
ALBANY						
Westburne Drlg Inc	60	dsl	650	National 50-A	700	9,000
BIG HORN						
Anderson-Myers Drlg Co	1	dsl	680	National T-32	350	7,500
	15	dsl	1500	Skytop/Brewster N-75-A	1500	14,000
Barnhart Drlg Co Inc	1	dsl	700	Ideco H-525	350	6,500
Exeter Drlg Northern Inc	19	dsl	700	Gardner-Denver 800	1100	14,000
CAMPBELL						
Atco Drlg Inc	20	dsl	800	Emsco GB-500	800	10,000
	6	dsl	1020	National 370	700	8,500
Cyclone Drlg Co	2	dsl	800	Bethlehem M-58	800	10,000
	4	dsl	800	Unit U-15	800	9,000
Exeter Drlg Northern Inc	17	dsl	500	National 50-A	750	9,500
	20	dsl	500	Emsco GC-500	750	11,000
	21	dsl	550	M-CSCO U-15	720	9,500
	3	dsl	550	National 50-A	750	9,500
	34	dsl	500	M-CSCO U-15	750	9,500
	38	dsl	500	M-CSCO U-15	750	9,500
	7	dsl	700	Brewster N-75	1000	12,000
	8	dsl	500	Brewster N-7	750	9,500
	9	dsl	750	Brewster N-75	1100	12,500
	10	dsl	500	Brewster N-55	750	10,500
Gallagher Drlg Inc	6	dsl	520	Cardwell Model O	970	12,000
GCO Drlg Co	7	dsl	1750	National 75-CA	1500	13,000
Green Drlg Co	3	dsl	1350	Emsco GA-500	900	10,000
Lohmann-Johnson Drlg Co Inc	20	dsl	700	OILWELL 600	600	10,000
Prairie Drlg Co	3	dsl	1000	Emsco GB-500	1000	10,000
Republic Drlg Serv Inc	5	dsl-elec	1200	OILWELL 760-E	1000	14,000
Star Drlg	81	dsl	1000	Gardner-Denver GD-800	1350	15,000
	82	dsl	1000	Gardner-Denver GD-700	1350	12,500
Transcontinental Drlg Co Inc	55	dsl	1020	OILWELL 76	980	12,000
	56	dsl	1100	Ideco H-750	910	10,500
CARBON						
Brinkerhoff Signal Inc	12	dsl	1000	National 55	1000	12,000
Century Drlg Co	2	dsl	425	National T-20	500	5,500/3½"
Exeter Drlg Northern Inc	11	dsl	700	Gardner-Denver 700	1000	12,500
J B Roden Drlg Co	2	dsl	370	Failing 90	380	5,500/4"
Pease Bros Inc	1	dsl	1275	National 55	1200	14,000
True Drlg Co	15	gas-LPG	1300	National 50-A	1000	11,500
Westburne Drlg Inc	51	dsl	850	National Ideal 55	1050	12,500
CASPER						
Tierra Drlg Corp	12	dsl-elec	750	BDW 800-MX	1000	14,000
	14	dsl-elec	1000	BDW 800-MX	750	14,000
	15		1000	M-CSCO U-712-EA	1200	16,000
CONVERSE						
Brinkerhoff Drlg Co Inc	57	dsl	1560	National N-80-B	1560	17,000
Exeter Drlg Northern Inc	18	dsl	500	National 50-A	750	9,500
	33	dsl	500	M-CSCO U-15	750	9,500
	39	dsl	500	M-CSCO U-15	750	9,500
Green Drlg Co	5	dsl	900	Unit Rig U-15	950	10,000
Harpel Drlg Co	4		1250	Brewster N-46	900	12,000
Lohmann-Johnson Drlg Co Inc	1	dsl	670	M-CSCO U-15 S/N 537	500	8,000
	4	dsl	1350	OILWELL 76-700 S/N H-27-15	600	12,000
W E S Corp	7		1000	Wilson Giant	1000	12,000
CROOK						
Cyclone Drlg Co	1	dsl	400	Emsco GB-250	600	7,500
Exeter Drlg Northern Inc	37	dsl	500	M-CSCO U-15	750	9,500
Transcontinental Drlg Co Inc	40	dsl	1200	OILWELL 76	1224	12,500
FREMONT						
Aspen Drlg Co	2	dsl	500	Challenger M-280-DD	500	4,500
Bomac Drlg Co	43	dsl	930	Emsco GB-500	930	10,500
Dixilyn-Field Drlg Co	32	dsl	2300	National 130	2331	25,000
	34	dsl-elec	3200	National 1320-UE	2500	25,000
	33	dsl-elec	2000	OILWELL 940-E	3000	20,000
	37	dsl	1600	National 80-UE	1800	15,000
Exeter Drlg Northern Inc	30	dsl	750	Emsco D-2	1000	12,500
Forwest Inc	1	dsl-elec	2600	Ideco E-2100	1800	22,000
J B Roden Drlg Co	5	dsl	650	Emsco GB-350	650	10,500
Loffland Bros Co	8	dsl	2100	M-CSCO U-914-C	2400	20,000
Parker Drlg Co	124	dsl	2000	OILWELL 2000-E	2750	25,000
Prairie Drlg Co	5	dsl	1000	Emsco GB-500	1000	10,000
R L Manning Co	26	gas-btne	1300	Emsco GB-800	1365	14,000

WYOMING (Cont'd)

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
FREMONT (Contd)						
Rosamond Drlg Co	8	dsl	2350	National 130	2475	25,000
Tom Brown Inc	21	dsl	1100	National 75-CA	1100	14,000
Trigg Drlg Co Inc	6	dsl-elec	2400	Emsco	2400	25,000
Westburne Drlg Inc	54	dsl	655	National 50-A	800	9,000
	56	dsl	750	Emsco GC-500	950	12,000
	58	dsl	310	National T-32	275	7,000
HOT SPRINGS						
Anderson-Myers Drlg Co	4	dsl	1450	Emsco GA-500	1200	11,000
Barnhart Drlg Co Inc	2	dsl	600	National T-20	350	5,000
JOHNSON						
Exeter Drlg Northern Inc	35	dsl	500	M-CSCO U-15	750	9,500
Green Drlg Co	4	dsl	900	Unit Rig U-15	900	10,000
Loffland Bros Co	40	dsl	1680	Brewster N-95	2200	16,000
LINCOLN						
Anderson-Myers Drlg Co	3	dsl	1450	Emsco GA-500	1200	11,000
Exeter Drlg Northern Inc	28	dsl	1200	Gardner-Denver 800	1200	15,000
J B Roden Drlg Co	3	dsl	1575	OIME 1500-SL	1575	19,000
Loffland Bros Co	108	dsl	2160	Brewster N-12-A	2400	25,000
	60	dsl-elec	1800	M-CSCO U-712-A	2000	17,000
Montgomery Drlg Co	31	dsl	2000	National 110-UE	2700	18,000
	32	dsl	2700	National 110-UE	2000	18,000
Parker Drlg Co	163	dsl	1650	OIME 1500-P	1650	20,000
R L Manning Co	20	dsl	1341	Emsco J-1000	1341	14,000
	33	dsl-elec	2300	Emsco C-1	1500	19,500/5"
True Drlg Co	16	gas-LPG	1300	National 50-A	1000	11,000
	17	dsl	1350	National 50-A	1000	12,000
NATRONA						
Brinkerhoff-Signal Inc	14	dsl	1000	National 55	1000	12,500
Dixilyn-Field Drlg Co	31	dsl-elec	2300	National 1320-UE	5000	25,000
Harpel Drlg Co	5	dsl	1250	Brewster N-42	700	8,500
Parker Drlg Co	169	dsl	1650	OIME 1500-P	1650	20,000
True Drlg Co	19	dsl	1000	National 50-A	1000	12,000
NIOBRARA						
Anderson-Myers Drlg Co	10	dsl	650	National T-32	650	8,500
Atco Drlg Inc	27	dsl	720	Bethlehem C-50	720	8,500
Harpel Drlg Co	3	dsl	1150	Ideco H-725	900	10,000
Prairie Drlg Co	2	dsl	450	Emsco GB-160-T	300	5,000
True Drlg Co	18	dsl	350	Emsco GB-250-T	350	6,500
PARK						
Barnhart Drlg Co Inc	3	dsl	600	Ideco H-35	350	5,500
Brinkerhoff Drlg Co Inc	54	dsl-elec	2325	National 110-UE	2325	18,000
R L Manning Co	16	gas-btne	675	National T-32	458	6,500
	17	gas-btne	875	Emsco GC-500	910	11,000
	28	gas-btne	800	Emsco GB-350	488	7,500
	8	dsl	850	Emsco GA-500	894	9,000
Wyoming Well Serv Inc	21	dsl	500	Ideco H-35	318	5,000
	24	dsl	13000	Cardwell 200-A	318	4,500
	30	dsl	13000	Cardwell 200-A	318	4,500
SHERIDAN						
Exeter Drlg Northern Inc	36	dsl	450	Bethlehem M-58	750	11,000
SUBLETTE						
Brinkerhoff-Signal Inc	6	dsl	1500	Gardner-Denver 1100	1500	18,000
Helmerich & Payne Intl Drlg Co	81	scr	2200	National 110-UE	1500	20,000
J B Roden Drlg Co	1	dsl	636	Emsco GB-350	640	8,500
	6		750	National CA-75	750	12,000
Loffland Bros Co	97	dsl-elec	3300	M-CSCO U-1220-EB	3300	25,000
Norton Drlg Co	6	dsl	550	Wilson 75	950	12,000
Roden Drlg Co	4	dsl	1000	Emsco GB-350	700	10,000
Viersen & Cochran Drlg Co	14	dsl	2300	Emsco 800-A	1554	18,000
SUMMIT						
Anderson-Myers Drlg Co	7	dsl	1200	National 55	1500	12,000
Exeter Drlg Northern Inc	23	dsl	500	M-CSCO U-15	720	8,700
R L Manning Co	6	gas-btne	1368	Emsco GB-800	1368	14,000
	30	dsl-elec	2000	Emsco D-3	1000	16,500

WYOMING (Cont'd)

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
SWEETWATER						
Anderson-Myers Drlg Co	17		2300	National 110	2300	18,000
Atco Drlg Inc	25	dsl	700	Ideco H-525	700	9,500
	56	dsl-elec	1800	National 80-UE	1800	15,000
Brinkerhoff-Signal Inc	3	dsl	1000	National 55	1000	12,000
Exeter Drlg Northern Inc	24	dsl	1000	M-CSCO U-20	1500	15,000
	31	dsl	1000	Gardner-Denver 800	1500	15,000
Helmerich & Payne Intl Drlg Co	53	dsl-elec	800	Ideco H-525	1000	11,500
Loffland Bros Co	208	dsl	1560	National 110	1800	16,000
	234	dsl	2160	M-CSCO U-40	2400	13,000
	29	dsl-elec	1400	M-CSCO U-36-A	1600	11,000
Lord Drlg Co Inc	1	dsl	2200	OILWELL M-860	1650	18,000
Norton Drlg Co	8	dsl	550	Wilson 75	950	12,000
R L Manning Co	7	gas-btne	885	Emsco G-500	756	8,500
Parker Drlg Co	177	dsl	1300	OIME SL-1000-P	1300	15,000
Pool Well Serv Co	66	dsl	300	Cabot 500	6000	5,500
Prairie Drlg Co	1	dsl	500	Ideco H-35	300	6,500
	6	dsl	1200	M-CSCO U-40	1200	12,500
R L Manning Co	22	dsl	900	Emsco A-550	1100	11,000
	29	dsl	800	Emsco GB-500	860	9,000
Transcontinental Drlg Co Inc	53	dsl	900	National 50-A	980	9,000
	57	dsl	1400	Bethlehem M-810	1224	13,000
True Drlg Co	14	dsl	1000	National 50-A	1000	12,000
	9	dsl	1200	M-CSCO U-40	1200	15,000
TETON						
Brinkerhoff-Signal Inc	72	dsl	2000	National 1320-UE	2000	25,000
UINTA						
Anderson-Myers Drlg Co	12	dsl	2000		2000	18,000
	14	gas	1500	Skytop/Brewster N-75-A	1500	14,000
Bomac Drlg	29	dsl	2000	OILWELL 96	2300	18,000
	44	dsl	2000	Gardner-Denver 800	1800	16,000
Brinkerhoff-Signal Inc	7	dsl	1500	National 80-B	1500	15,000
	73	dsl	1500	National 80-B	1500	15,000
Loffland Bros Co	184	dsl	2160	M-CSCO U-712-A	2400	15,000
	214	dsl	1860	M-CSCO U-40	1600	13,000
	30	dsl-elec	2160	M-CSCO 914-EC	2200	20,000
Lord Drlg Co Inc	3	dsl	2200	OILWELL M-860	1650	18,000
Noble Drlg Corp	N-116	dsl	2250	National 110-UE	2000	20,000
	E-1101	dsl	2000	Emsco A-1100	1800	18,000
	OW-1	dsl	2200	OILWELL 96	1800	18,000
	132	dsl-elec	2600	National 1320-UE	2000	22,000
Parker Drlg Co	171	dsl	4650	OIME 1500-P	1650	20,000
	173	dsl	1650	OIME 1500-P	1650	20,000
R L Manning Co	21	dsl	1365	National 80-B	1365	15,000
	25	dsl	1180	Brewster N-75	1180	11,500
	31	dsl-elec	1550	Emsco D-2	700	11,000
Transcontinental Drlg Co Inc	41	dsl	2450	Gardner-Denver GD-1100	2742	18,000
Viersen & Cochran Drlg Co	8	dsl	1450	National 80-B	1554	18,000
WASHAKIE						
Anderson-Myers Drlg Co	2	dsl	1600	National 55	1200	12,000
	9	dsl	1450	National 55	1200	12,000
	11	dsl	1500	National 55	1200	12,000
Bomac	28	dsl	930	Emsco G-500	930	10,500
WESTON						
Enopco	2	dsl	1890	National 610	1080	13,000
Farnsworth & Kaiser Drlg Co	1	dsl	900	M-CSCO U-15	900	8,000
	3	dsl	330	Joy 300	330	4,000
	6	dsl	450	M-CSCO U-34	450	6,500
L & R Drlg Co	4		400	Franks Rocket	195	3,000/3½"
UINTA						
Lord Drlg Co Inc	2	dsl	2200	OILWELL M-860	1650	18,000

Canadian Rotary (Land) Drilling Contractors

ADECO DRLG & ENGR CO LTD 505-2nd St SW Calgary AB Canada T2P 1N8 403-266-6291
ARGUS DRLG-DIV TARO IND 1580-540 5th Ave SW Calgary AB Canada T2P 0M2 403-264-3040
ATCO DRLG INC 1001-500-4th SW Calgary AB Canada T2P 2V6 403-263-1215
BALTIC DRLG LTD 901-7015 MacLeod Trail SW Calgary AB Canada T2H 2K6 403-259-5213
BAWDEN PETER SERV LTD 2750 400 4th Ave SW Calgary AB Canada T2P 1G7 403-265-1511
BEAVER DRLG LTD 1117 Sun Oil Bldg 500 4th Ave Calgary AB Canada T2P 2V6 403-265-6472
BIRD OIL EQUIPMENT LTD 304 8th Ave SW Suite 800 Calgary AB Canada T2P 1C2
BLOCKER CANADA LTD 304 6th Ave SW Calgary AB Canada T2P 0R4 403-233-0866
BOW ISLAND DRLG SW 1417-500 4th Ave Calgary AB Canada T2P 2V6 403-264-5413
CACTUS DRLG CORP LTD P O Box 1508 Calgary AB Canada T2P 2L6 403-263-5670
CAN TEX DRLG & EXPL LTD 1520 Royal Bk Bldg 335 8 Ave S Calgary AB Canada T2P 1C9 403-265-8441
CAPRI DRLG LTD 314-540 12 Ave SW Calgary AB Canada 403-261-5991
CHALLENGER DRLG 220-444 7th Ave SW Calgary AB Canada T2P 0X8 403-269-3121
CORUNNA PETR LTD P O Box 640 Corunna Ontario N0N 1G0 Canada 519-862-5505
GARNETT DRLG LTD 814-603-7 Ave SW Calgary AB Canada T2P 2T5 403-262-7906
GUTHRIE MC LAREN DRLG LTD 14630 119th Ave Edmonton AB Canada T5L 2P2 403-455-3191
HI TOWER DRLG Box 6650 Stn D Calgary AB Canada T2P 2V8 403-231-1211
JADE DRLG LTD 9816 8-44 Ave Edmonton AB Canada T6E 5E5 403-437-2930
JOMAX DRLG LTD P O Box 8432 Edmonton AB Canada T2P 3E6 403-265-5312
KENTING DRLG CO LTD 370 700 6th Ave SW Calgary AB Canada T2P 0T8 403-263-2980
KISSINGER PETR LTD 540 5th Ave SW Suite 1420 Calgary AB Canada T2P 0M2 403-265-2705
LOFFLAND BROS CO P O Box 2847 Tulsa OK 74101 918-622-9330
MONTGOMERY DRLG CANADA LTD 960-700-4 Ave SW Calgary AB Canada T2P 3J4 403-232-1644
MUSTANG DRLG 1426 500 Fourth Ave SW Calgary AB Canada T2P 2V6 403-263-8520
NABORS ALASKA DRLG INC 324 Eighth Ave SW TD Square Calgary AB Canada T2P 272 403-263-6610
NUGGET DRLG LTD 8755 51 Ave Edmonton AB Canada T6E 541 403-468-2133
PARKER DRLG CO 8 E Third St Tulsa OK 918-585-8221
PRECISION DRLG LTD Suite 1204 500 4th Ave SW Calgary AB Canada T2P 2V6 403-164-4882
RED ARROW DRLG LTD 520 304 8th Ave SW Calgary AB Canada T2P 1C2 403-264-0695
REGENT DRLG LTD 12912 125th Ave Edmonton AB Canada T5L 3C1 403-455-2121
S & T DRLG LTD 5825 - 98 St Edmonton AB Canada T63 3L4 403-955-7011
SARCEE DRLG DIV ATCO DRLG LTD 700-800 6th Ave SW Calgary AB Canada T2P 2V6 403-263-5040
SEDCO DRLG DIV OF BOW VALLEY 630-6 Ave SW Calgary AB Canada T2P 0S8 403-231-1211
SHELBY DRLG LTD 400-1550 5th St SW 2830 Calgary AB Canada T2R 1K3 403-269-7976
SIMMONS DRLG CANADA LTD 524-550 6th Ave SW Calgary AB Canada T2P 0S2 403-263-7686
TRI CITY DRLG LTD 14305 120 Ave Edmonton AB Canada T5L 2R8 403-453-3771
WESTBURNE DRLG CANADA LTD 200 535 7th Ave SW Calgary AB Canada T2B 0Y4 403-233-6600

Petroleum Engineer INTERNATIONAL

Canadian Contract Rotary (Land) Drilling Rigs

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
ALBERTA						
UNDESIGNATED						
	7	dsl	225	RAD 200	275	6,000
Atco Drlg Co	12	dsl	1950	National 80-B Hercules	1950	14,000
	10	dsl	400	Brewster N-45	400	7,500
	11	dsl	1500	National 55 Hercules	1500	11,500
	14	dsl-elec	2200	National 1320 Hercules	2200	20,000
	3	dsl	500	National T-45	680	8,500
	4	dsl	1200	National 55 Hercules	1200	11,500
	9	dsl	400	National T-20	400	5,000
	1	dsl	325	Ideco H-35-D	278	6,500
	16	dsl	500	Emsco GA-350	556	7,500
	17	dsl	600	OILWELL 66	800	9,500
	18	dsl	278	National T-32	278	6,500
	19	dsl	500	OILWELL 66	556	9,500
	20	dsl	650	Emsco GA-500	652	9,500
	25	dsl	370	Emsco GA-350	556	7,500
	5	dsl	325	National T-32	278	6,500
	59	dsl	1800	National 80-UE	1800	15,000
	6	dsl	526	Brewster N-45	556	8,000
	8	dsl	650	Ideco H-525	652	8,500
	7	dsl	720	Ideco Super 750	720	10,500
Baltic Drlg 1979 Ltd	10	dsl	940	Superior 700	600	9,500
	1	dsl	870	Superior 700	600	9,000
	14	dsl	800	National 50-AM	550	9,500
	2	dsl	1600	National 80-B	1850	15,000
	24	dsl	300	National T-20	326	6,500/4"
	3	dsl	1000	Superior 700	600	9,500
	34	dsl	800	Emsco GC-350	550	8,500
	4	dsl	1000	Superior 700	600	9,500
Beaver Drlg Ltd	1	dsl	300	National T-32	300	7,000
	2	dsl	300	National T-20	300	6,000
	3	dsl	300	National T-20	300	6,000
	4	dsl	300	National T-32	300	7,000
	5	dsl	300	National T-32	300	7,500
	6	dsl	300	National 370	550	8,500
	7	dsl	550	National 370	550	9,500
	8	dsl	300	National T-32	300	7,000
	9	dsl	550	National 370	550	9,500
Bird Oil Equipment Ltd	1	dsl		Ideco	300	5,000
Blocker Canada Ltd	1	dsl	2000	OIME 1500-SL	1500	18,000
	2	dsl	2000	OIME 1000-SL	1500	16,000
	3	dsl	1500	OIME 750-SL	1155	12,000
	4	dsl	1500	OIME 750-SL	1155	12,000
	5	dsl	1550	Brewster N-75	1425	12,000
	6	dsl	1550	OIME 1000-SL	1500	16,000
	10	dsl	1000	OIME 5-D3	770	10,000
	7	dsl	1500	OIME 750-SL	1155	12,000
	8	dsl	1600	OIME 750-SL	1155	12,000
	9	dsl	1600	OIME 750-SL	1155	12,000
Can-Tex Drlg & Expl Ltd	10	dsl	400	Cardwell J-450	450	7,000
	5	dsl	1200	Emsco GB-800	1200	12,000
	6	dsl	1400	Emsco GB-80083	1275	14,000
	8	dsl	820	OILWELL 66	820	9,000
Capri Drlg Ltd	1	dsl	300	National T-12	330	5,000
	2	dsl	300	National T-12	330	3,500
	3	dsl	300	Ideco H-25-D	330	6,500
	4	dsl	250	TSM-3000	330	3,000
	5	dsl	700	National T-32	700	8,000
	6	dsl	850	National 50 A	1365	10,000
Challenger Drlg	11	dsl	300	National T-20	350	6,500
	12	dsl	500	National 50-A	600	9,000
	15	dsl	1050	Ideco 711	1010	12,500
	2	dsl	700	National T-45	505	9,000
	3	dsl	500	National 50-A Modified	600	9,000
	10-E	dsl-elec	2400	M-CSCO Unit 1220-E	3000	22,000/5"
	51	dsl	2000	National 110	1800	19,000/5"
	7-E	dsl-elec	1400	National 80-E	2230	14,500/5"
	39-H	dsl	300	National T-20	350	6,500
	4-E	dsl-elec	1100	National T-45	960	9,000
	44	dsl	1500	National 80-B	1695	14,000/5"
	45	dsl	1800	National 100-HD	1800	18,000/5"
	5-E	dsl-elec	1400	National 55-E	1750	13,000/5"
	8-E	dsl-elec	1400	National 80-E	2250	14,500/5"
	49	dsl	2000	National 110	1800	19,000/5"
Garnett Drlg Ltd	10	dsl	1400	National 610	900	11,000
	3	dsl	900	Cardwell J-700	900	11,000
	5	dsl	900	Brewster N-55	900	11,000
	6	dsl	1100	M-CSCO U-40	900	11,000
	7	dsl	1600	National 610	1200	12,000
	9	dsl	1200	Brewster N-7	900	11,000
Hi Tower Drlg	18	dsl-elec	2400	OILWELL 760	2400	15,000
	20	dsl-elec		760	2400	2,400
	7	dsl	1000	OILWELL 66	1000	10,000
ALBERTA (Cont'd)						
UNDESIGNATED (Contd)						
Hi Tower Drlg Div Bow Valley	1	dsl-elec	2800	National 1320-UE	1400	20,000
	10	dsl	1200	OILWELL 76	1200	12,000
	11	dsl	700	M-CSCO U-34	350	6,000
	16	dsl	1220	M-CSCO U-40	1220	12,500
	17	dsl	650	National 50-A	340	7,000
	23	dsl	1100	National 50-A	810	9,000
	3	dsl	1020	OILWELL 66	1020	10,000
	6	dsl	1020	OILWELL 76	1020	12,000
	8	dsl	1200	OILWELL 76	1200	10,500
	9	dsl	880	National 50-A	600	8,500
	19	dsl	580	OILWELL 52-T	350	6,500
	4	dsl-elec	3400	OILWELL E-2000	2000	20,000
Jade Drlg Ltd	1	dsl	230	Wilson Super 38	185	3,500
	2	dsl	230	Wilson Super 38	185	3,500
	3	dsl	380	Ideco H-25	380	5,900
	4	dsl	500	Ideco H-25	430	5,900
	5	dsl	500	Ideco H-30	420	70,000
Kenting Drlg Co Ltd	30-E	dsl-elec	2000	National 80-UE	1000	12,000
Kissinger Petr Corp	1	dsl	500	Cardwell J-450	500	7,000
	1	dsl	318	Cardwell J-450	318	6,500
	4	dsl	300	National T-12	300	4,500
	3	dsl	100	National T-8	220	2,500
Loffland Bros Co	171	gas	2132	M-CSCO U-914-B	1700	18,000
	221	dsl	2880	M-CSCO U-1220-AE	3200	25,000
	36	dsl	2000	M-CSCO U-914-C	2880	20,000
	89	dsl-elec	2100	M-CSCO U-1220-EB	2400	25,000
	93	dsl-elec	2100	M-CSCO U-1220-EB	2400	25,000
Montgomery Drlg Canada Ltd	41	scr	1350	National 1320-UE	2000	23,000/5"
	45	dsl	1200	Emsco GB-800	1000	12,000/5"
	46	dsl-elec	1500	National 1320-UE	2400	23,000/5"
	49	scr	1000	National 110-E	1800	2,100
Nabors Drlg Ltd	5	dsl	1245	OILWELL 76	1326	12,000
	10	dsl	970	National 50-A	770	10,000
	11	dsl	1070	National 50-CA	770	8,500
	12	dsl	1200	OILWELL 66	884	11,000
	15	dsl	1200	Emsco A-550	884	11,000
	16	dsl	1700	Emsco A-800	1740	15,000/5"
	19-E	dsl-elec	2000	Emsco C-I Type II	3900	20,000
	2	dsl	1195	OILWELL 76	1326	12,000
	20	dsl	2600	National 110	2800	20,000/5"
	23-E	dsl-elec	1600	Emsco D-2	1800	12,000
	24-E	dsl-elec	2600	Emsco Electrohoist 2-C	3900	14,000
	4	dsl	1700	OILWELL 76	1900	14,000
	7	dsl	1200	National 55	770	11,000
Parker Drlg Co	123-HH/12	dsl	1200	OIME SL-1500	1800	17,000
	98	dsl	1500	National 100	1950	17,000
Peter Bowden Drlg Serv Ltd	18	dsl	2300	National 110-M	1500	16,000/5"
	30	dsl	1850	Emsco D-3 1000	1000	15,000
Precision Drlg Ltd	1	dsl	350	Ideco H-30-FD Super	350	6,500
	10	dsl	350	Ideco H-35-D	350	7,200
	11	dsl	350	Ideco H-40-PD	350	7,200
	12	dsl	500	Ideco H-35-D	350	7,200
	14	dsl	350	Ideco H-40	500	7,200
	15	dsl	350	Ideco H-30-FD	350	7,200
	3	dsl	350	Ideco H-30 Super 2-FD	350	6,500
	4	dsl	350	Ideco H-35-D	350	7,200
	5	dsl	350	Ideco H-525-D	350	7,500
	6	dsl	350	National T-20	350	5,500
	7	dsl	350	Ideco H-35-D	500	7,000
	8	dsl	350	Ideco H-30-D	350	5,500
	9	dsl	350	Ideco H-35-D	350	7,200
Red Arrow Drlg Ltd	1	dsl	225	National T-20	275	6,000
	10	dsl	225	RAD 200	275	1,850
	11		225	RAD 200	275	6,000
	12	dsl	225	RAD 200		1,850
	2	dsl	225	National T-12	275	5,000
	3	dsl	225	National T-20	275	6,000
	4	dsl	225	National T-20	275	6,000
	5	dsl	225	National T-20	275	6,000
Regent Drlg Ltd	17-E	dsl	2700	Gardner-Denver	1000	14,000
Sarcee Drlg	10	dsl	300	Ideco H-30-F	259	5,500
	11	dsl	350	Ideco H-30-F	259	5,500
	14	dsl	360	Ideco H-35-D	350	7,500
	1	dsl	300	Ideco HD-25	230	5,000
	12	dsl	350	Ideco H-35	259	7,500
	2	dsl	300	Brewster N-4	224	5,500
	3	dsl	300	National T-20	224	5,500
	4	dsl	300	National T-20	224	5,500
	5	dsl	300	Brewster N-4	224	5,500
	6	dsl	300	Ideco H-30-AD	230	5,500

ALBERTA (Cont'd)

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
UNDESIGNATED						
Sarcee Drlg	8	dsl	250	National T-12	230	5,000
	9	dsl	250	National T-20	230	5,500
Sedco Drlg Div of Bow Valley	79	dsl	300	Gardner-Denver 3000	240	4,000/3½"
	83	dsl	300	Cardwell 150-A	280	
	86	dsl	300	Kremco K-600-D	350	4,500
	88	dsl	350	Cardwell S-350	350	5,500
	89	dsl	330	Ideco H-30-D	330	4,000/4½"
	92	dsl	300	Cardwell S-350	240	4,500
	93	dsl	300	Cardwell AT-150 Double Drum	200	3,500
	95	dsl	300	Cardwell AT-150 Double Drum	200	3,500
	97	dsl	300	National T-32	300	6,500
	99	dsl	330	Emsco GA-250	300	6,500
Shelby Drlg Ltd	1	dsl	360	Cooper TC 42x12	365	5,500/3½"
	2	dsl	360	Cooper 42-12 300 Oiler	350	5,500/3½"
	3	dsl	360	Franks Rocket 111	450	6,000
	5	dsl	360	Cooper 42x12 550 Oiler	450	6,500
	7	dsl	360	Cooper 32-32	225	3,000/3½"
BEAVERLODGE						
Kenting Drlg Co Ltd	20	dsl-elec	2400	M-CSCO U-914-E	2000	20,000/5"
BERLAND RIVER						
Peter Bawden Drlg Serv Ltd	19	dsl	1200	OILWELL 76	700	12,000
BIGORAY						
Adeco Drlg & Engr Co Ltd	2	dsl	380	OIME 503	365	8,500
Cactus Drlg	16	dsl	500	Unit 34	500	6,500
BOLTON						
Peter Bawden Drlg Serv Ltd	2	dsl-elec	2400	National 1320-UE	2000	22,000/5"
BONNYVILLE						
Tri-City Drlg (1968) Ltd	6	dsl	250	Failing 2500	210	3,000/3½"
BRAZEAU						
Peter Bawden Drlg Serv Ltd	15	dsl	1550	Unit U-40-D	800	12,000
Westburne Drlg (Canada) Ltd	10	dsl	1275	National 80	1275	13,000/5"
BRAZEAU RIVER						
Mustang Drlg	11	dsl	1200	National 55	1200	12,000
	18-UE		1800	National 80-UE	1000	14,000
BRETON						
Regent Drlg Ltd	1	dsl	320	Ideco H-40	280	7,500
BROWN CREEK						
Peter Bawden Drlg Serv Ltd	31	dsl	2300	OILWELL 96	1500	205
BRUCE						
Simmons Drlg Ltd	1	dsl	440	Hycalog HH-6000	440	7,000
CACHE CREEK						
Jomax Drlg Ltd	7	dsl-elec	2400	OILWELL 760	1600	5,000
CACTUS LAKE						
Westburne Drlg (Canada) Ltd	34	dsl	360	Ideco HD-25	360	4,500/3½"
CAROLINE						
Adeco Drlg & Engr Co Ltd	17		690	OIME S/L 750	1035	12,000
Cactus Drlg Corp Ltd	5	dsl	1554	Ideco Super 711	1554	15,000
Kenting Drlg Co Ltd	29	dsl	1040	National 610	1040	11,500
Mustang Drlg	15-E	dsl-elec	1600		1600	12,000
Regent Drlg Ltd	28	dsl	1400	Brewster N-75	1400	14,000
CARSON CREEK						
Peter Bawden Drlg Serv Ltd	1	dsl	1000	Emsco GB-500	500	8,500
CHINOOK RIDGE						
Regent Drlg Ltd	12-E	dsl	2200	Gardner-Denver 1500	2592	20,000
CLARESHOLM						
Kenting Drlg Co Ltd	23	dsl-elec	2000	National 610-E	1000	11,500
Nugget Drlg Ltd	5	dsl	2000	National 55-M	2000	12,000
CLAYHURST						
Peter Bawden Drlg Serv Ltd	20	dsl	1000	Gardner-Denver 500	500	9,000
COLD LAKE						
Simmons Drlg Ltd	7	dsl	440	Hycalog HH-6000	440	7,000
CONSORT						
Bow Island Drlg	10	dsl	278	Walker-Neer 2000	278	3,000/3½"
CRAIGMULE						
Cactus Drlg Corp Ltd	3	dsl	350	M-CSCO U-34	350	6,500
CUTBANK						
Kenting Drlg Co Ltd	31	dsl-elec	2000	National 110-UE	1000	14,000
CYN-PEM						
Cactus Drlg Corp Ltd	28	dsl	1200	Brewster N-75	1200	12,500
CZAR						
Tri-City Drlg (1968) Ltd	2	dsl	300	M-CSCO U-34	300	6,000
DIXONVILLE						
Kenting Drlg	28	dsl	700	National 370	700	9,000
DRUMHELLER						
Cactus Drlg Corp Ltd	1	dsl	750	Brewster N-55	750	8,500
Kenting Drlg Co Ltd	5	dsl	350	National T-20	350	5,500
ECKVILLE						
Westburne Drlg (Canada) Ltd	23	dsl	1050	National 50-A	700	8,500
EDGERTON						
Bow Island Drlg	1	dsl	278	Walker-Neer 2000	278	3,000/3½"
EDSON						
Guthrie McLaren Drlg Ltd	5	dsl	375	National 50-CA	400	8,500
Jomax Drlg Ltd	4	dsl	1200	OILWELL 76-700	1275	4,300
	6	dsl-elec	2400	OILWELL 760	1600	5,000
Regent Drlg Ltd	22	dsl	560	M-CSCO U-36-A	500	8,500
	25	dsl	1400	Brewster N-75	1400	14,000
Westburne Drlg (Canada) Ltd	11	dsl	1725	OILWELL 96	1725	20,000/5"
	5	dsl	1950	National 1320-M	1950	20,000/5"
ELMWORTH						
Mustang Drlg	8-E	dsl-elec	1600	National 610-E	1600	12,000
FAIRVIEW						
Kenting Drlg Co Ltd	24	dsl	350	National 370	350	9,000
FENNER						
Kenting Drlg Co Ltd	33	dsl-elec	1000	Superior 700-E	700	9,000
FERRIER						
Cactus Drlg	14	dsl	750	Emsco GB-500	750	8,000
	15	dsl	750	Emsco GC-350	750	6,500
	12	dsl	1554	National 80-B	1554	15,000
Mustang Drlg	10	dsl	652	Brewster N-45	326	8,500/4"
	17-E	dsl-elec	1600	National	1600	12,000
FORTY MILE						
Cactus Drlg Corp Ltd	8	dsl	350	M-CSCO U-34	350	6,500
FOX CREEK						
Jomax Drlg Ltd	1	dsl	800	OILWELL 52-T	455	2,750
FREDA LAKE						
Simmons Drlg Ltd	2	dsl	440	OILWELL 52-T	440	6,500
FT MC LEAD						
S & T Drlg (Northern) Ltd	5	dsl	1200	National 50-A	800	9,500
FT SASKATCHEWAN						
Simmons Drlg Ltd	8	dsl	440	Hycalog HH-600	440	7,000
GOLD CREEK						
Kenting Drlg Co Ltd	6	dsl	1500	Brewster N-85	1500	14,500
Mustang Drlg	16-UE	dsl-elec	2745	National 110-UE	2745	2,000/5"
GRANDE CACHE						
Regent Drlg Ltd	14-E	dsl	2800	OILWELL 840-E	1800	20,000
Westburne Drlg (Canada) Ltd	3	dsl	1560	OILWELL 860	1560	18,000/5"
	28	dsl	960	National 55	960	11,000
GRANDE PRAIRIE						
Argus Drlg Div of Taro Oilfield	4	dsl	319	M-CSCO U-34	327	6,000
Jomax Drlg Ltd	3	dsl	800	OILWELL 52-T	450	2,600
Kenting Drlg Co Ltd	14	dsl	1500	National 80-B	1500	14,500/5"
	15	dsl	720	National 370	720	8,000
	18	dsl	800	National 50-A	800	9,500/5"
Mustang Drlg	5	dsl	946	National T-45	620	9,000/4"
	6	dsl	1230	Emsco A-550	1230	12,000/4"
Nugget Drlg Ltd	1	dsl	1500	National 610	1000	12,000
	6	dsl	1000	National 55-M	1000	12,000
	7	dsl	1000	National 610	1000	12,000
S & T Drlg (Northern) Ltd	1-E	dsl	1100	National 5	1100	11,500
	6	dsl	1100	National 610	1100	11,500
HANNA						
Regent Drlg Ltd	29	dsl	300	Brewster N-4	365	6,000
HINTON						
Kenting Drlg Co Ltd	3	dsl	1000	Emsco GC-500	1000	12,000
	4	dsl	720	610	720	11,500
Regent Drlg Ltd	21	dsl	2200	OILWELL M-2000	2592	20,000
S & T Drlg Ltd	11	dsl	1300	Unit 20	1300	12,000
HOUSE MOUNTAIN						
Peter Bawden Drlg Serv Ltd	17	dsl	850	Gardner-Denver 500	500	9,000
HUGHENDEN						
Tri-City Drlg (1958) Ltd	3	dsl	250	Failing 2500	200	3,000/3½"
INNES FAIL						
Kenting Drlg Co Ltd	16	dsl	350	M-CSCO U-34	350	6,500
JONES						
Kenting Drlg Co Ltd	35	dsl	350	National T-12	330	5,000
JUMI						
Cactus Drlg Corp Ltd	25-E	dsl-elec	3400	Emsco C-2	2000	20,000

ALBERTA (Cont'd)

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
KAKWA						
Cactus Drlg Corp Ltd	23	dsl	880	Emsco GC-500	880	11,500
Mustang Drlg	3	dsl	726	National T-45	620	9,000/4"
Westburne Drlg (Canada) Ltd	18	dsl	1680	Unit Rig U-914-C	1680	18,000/5"
KEHO						
Adeco Drlg & Engr Co Ltd	14	dsl	312	National T-32	320	7,200
KIRBY						
Simmons Drlg Ltd	50	dsl	440	M-CSCO	440	6,500
	51	dsl	440	M-CSCO	440	6,500
LAC LA BICHE						
Sedco Drlg Div of Bow Valley	71	dsl	240	Failing 2500	175	3,000/3½"
LAMONT						
Tri-City Drlg (1968) Ltd	8	dsl	300	Failing 3500	280	3,500/3½"
LATOR						
Westburne Drlg (Canada) Ltd	13	dsl	600	Emsco GA-350	600	8,000
LEDUC						
Regent Drlg Ltd	5	dsl	840	Brewster N-7	560	9,500
S & T Drlg (Northern) Ltd	9	dsl	800	National 370	800	8,500
LIMESTONE						
Peter Bawden Serv Ltd	12	dsl	1700	Emsco A-800-WE	1000	15,000/5"
LLOYDMINSTER						
Guthrie McLaren Drlg Ltd	12	dsl	325	Superior S-400	300	5,000
Sedco Drlg Div of Bow Valley	77	dsl	320	Failing 2500	240	3,000/3½"
Tri-City Drlg (1968) Ltd	4	dsl	300	Failing Stratmaster 90	280	5,000/3½"
MAJOR						
Adeco Drlg & Engr Co Ltd	12	dsl	312	National T-32	320	2,200
MARYBERRIES						
Cactus Drlg Corp Ltd	4	dsl	3[illegible]	M-CSCO U-34	350	6,500
MAYERTHORPE						
Simmons Drlg Ltd	11	scr-elec	440	Hycalog HH-6000	440	6,500
MEDICINE HAT						
Bow Island Drlg	3	dsl	278	Walker-Neer 2000	278	3,000/3½"
	8	dsl	278	Walker-Neer 2000		3,000/3½"
MEDICINE LODGE						
Adeco Drlg & Engr Co Ltd	8	dsl	1500	National 100-M	2340	18,000
MERCOAL						
Peter Bawden Drlg Serv Ltd	14	dsl-scr	2600	National 1320-UE	2000	22,000/5"
MINBURN						
Bow Island Drlg	2	dsl	278	Walker-Neer 2000	278	3,000/3½"
MUDLAKE						
Cactus Drlg Corp Ltd	7	dsl	700	Emsco GB-350	700	8,500
MUSKEG						
Peter Bawden Drlg Serv Ltd	16	dsl	1800	Emsco D-3	1000	12,000
MYRNAM						
Westburne Drlg (Canada) Ltd	50	dsl	240	Failing 2500	180	3,000/3½"
NANTON						
Kenting Drlg Co Ltd	32	dsl-elec	3720	National 110-UE	2000	16,000
Regent Drlg Ltd	9	dsl	1400	Brewster N-75	1400	14,000
NISKU						
Bow Island Drlg	11	dsl-elec	300	Walker-Neer	1287	5,000
OBED						
Adeco Drlg & Engr Co Ltd	15	dsl	365	National T-45	575	10,500
Peter Bawden Drlg Serv Ltd	7	dsl	1200	National 55	700	11,500
OLDS						
Argus Drlg Div of Taro Industries Ltd		dsl	319	National T-32	327	7,000
PADDLE RIVER						
Adeco Drlg & Engr Co Ltd	16	dsl	308	National T-32	312	7,000
PATHER RIVER						
Regent Drlg Ltd	15-E	dsl	3200	Gardner-Denver 1500	2000	21,000
PEACE RIVER						
Westburne Drlg (Canada) Ltd	19	dsl	870	National T-32	360	7,500/4"
PEARCE						
Cactus Drlg Corp Ltd	2	dsl	940	National 55	940	11,500
PEM FINE						
Kenting Drlg Co Ltd	10	dsl	720	OILWELL 66	720	10,000
PEMBINA						
Mustang Drlg	2	dsl	1845	National 80-B	1845	15,000/5"
Peter Bawden Drlg Serv Ltd	21	dsl	2000	Emsco C-1	1500	18,000/5"
S & T Drlg Northern) Inc	3	dsl	1200	National 55	1200	11,500

ALBERTA (Cont'd)

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
PEMBINA (Contd)						
S & T Drlg (Northern) Ltd	4	dsl	600	National 50-CA	400	8,000
PINE CREEK						
Cactus Drlg Corp Ltd	21	dsl	900	Emsco GC-500	900	11,500
Peter Bawden Drlg Serv Ltd	26	dsl	1450	OILWELL 76	700	12,000/5"
PROVOST						
Simmons Drlg Ltd	10	dsl	440	M-CSCO U-34	440	6,000
Westburne Drlg (Canada) Ltd	39	dsl	310	Failing 3500	235	3,500/3½"
RED CAP						
Peter Bawden Drlg Serv Ltd	25	dsl-scr	2000	Emsco C-I Type II	1500	18,000/5"
RED EARTH						
Cactus Drlg Corp Ltd	24	dsl	300	Bethlehem 55	300	6,000
Guthrie McLaren Drlg Ltd	10	dsl	300	Dreco D-500	450	7,000/3½"
RETLAW						
Cactus Drlg Corp Ltd	9	dsl	350	M-CSCO U-34	350	6,500
RIMBEY						
Kenting Drlg Co Ltd	9	dsl	720	National T-32	720	7,500
Westburne Drlg (Canada) Ltd	24	dsl	360	National T-32	360	7,000
ROBB						
Adeco Drlg & Engr Co Ltd	9	dsl	2000	OIME Helihoist 1500	2000	17,000
ROCKY MOUNTAIN HOUSE						
Argus Drlg Div of Taro Industries Ltd		dsl	319	National T-32	327	8,000
Guthrie McLaren Drlg Ltd	9	dsl	1940	OIME 1500	1940	18,000/5"
Regent Drlg Ltd	10	dsl	780	Brewster N-7	560	9,500
Westburne Drlg (Canada) Ltd	15	dsl	900	Brewster N-7	600	8,500
SAKWA						
Cactus Drlg	17	dsl	500	Unit 34	500	6,500
SCHOOLER CREEK						
Peter Bawden Drlg Serv Ltd	8	dsl-elec	2200	OILWELL 860	1400	20,000/5"
SEDGEWICK						
Westburne Drlg (Canada) Ltd	7	dsl	350	Gardner-Denver 2500	170	3,500/3½"
SEVEN PERSONS						
Westburne Drlg (Canada) Ltd	21	dsl	360	National T-20	360	5,500/4"
SILVER VALLEY						
Regent Drlg Ltd	4	dsl	840	Brewster N-7	560	9,500
SIMONETTE						
Cactus Drlg Corp Ltd	22	dsl	1000	Emsco GC-500	1000	12,500
	29	dsl	500	Emsco GA-500		9,000
SLAVE LAKE						
Westburne Drlg (Canada) Ltd	8	dsl	360	Ideco H-40-D	360	7,000
SMOKEY RIVER						
Westburne Drlg (Canada) Ltd	4	dsl	1040	Emsco GC-500	1040	11,000/5"
	1	dsl	1560	National 80-B	1560	13,000/5"
SMOKY LAKE						
Bow Island Drlg	9	dsl	278	Walker-Neer 2000	278	3,000/3½"
Tri-City Drlg (1968) Ltd	7	dsl	250	Failing 2500	210	3,000/3½"
Westburne Drlg (Canada) Ltd	32	dsl	300	Failing 2500	210	3,000/3½"
SPRING COULEE						
Cactus Drlg Corp Ltd	10	dsl	700	National T-32	700	7,800
Kenting Drlg Co Ltd	8	dsl	350	Ideco H-20	350	5,000
ST PAUL						
Guthrie McLaren Drlg Ltd	8	dsl	300	Failing 2500-A	225	3,000/3½"
STETTLER						
Argus Drlg Div of Taro Oilfield	3	dsl	319	Mid-Cont Unit U-34	327	6,000
SUFFIELD						
Bow Island Drlg	6	dsl	278	Walker-Neer 2000	278	3,000/3½"
	7	dsl	278	Walker-Neer 2000	278	3,000/3½"
Westburne Drlg (Canada) Ltd	31	dsl	160	Failing 2500	275	3,000/3½"
	35	dsl	310	Failing 2500	160	3,000/3½"
	40	dsl	310	Failing 2500	175	3,000/3½"
SUNDRE						
Mustang Drlg	14-UE	dsl-elec	3000	National 1320-UE	3000	22,000/5"
S & T Drlg (Northern) Ltd	7	dsl	1200	National T-45	800	9,500

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
ALBERTA (Cont'd)						
SWAN HILLS						
Guthrie McLaren Drlg Ltd	2	dsl	300	Brewster N-4	300	6,500
	3	dsl	680	National 50-CA	600	10,000
Jomax Drlg Ltd	5	dsl	875	National JI-65	875	10,500
Westburne Drlg (Canada) Ltd	202-H	dsl	1150	National 4-10	1590	10,000
TABER						
Guthrie McLaren Drlg Ltd	7	dsl	300	National T-32	300	7,000/3½"
THREE HILLS						
Argus Drlg Div of Taro Oilfield	2	dsl	319	Emsco 250-T	327	6,500
S & T Drlg (Northern) Ltd	2	dsl	350	National T-32	350	7,000
	10	dsl	350	Unit 34	350	6,000
TWO HILLS						
Tri-City Drlg (1968) Ltd	1	dsl	250	Failing 2500	200	3,000/3½"
Westburne Drlg (Canada) Ltd	33	dsl	310	Failing 3500	160	3,500/3½"
VALLEYVIEW						
Regent Drlg Ltd	11	dsl	2200	OILWELL 840-E	2592	20,000
Sedco Drlg Div Bow Valley	80	dsl	375	Shaffer	350	6,000
	82		375	Superior 300	263	4,500
	81	dsl	375	Superior 400	318	5,000
Shelby Drlg Ltd	54-E	dsl-elec	1000	National 370-E	650	9,000
	8	dsl	1200	OIME 750-SL	1200	14,000
Westburne Drlg (Canada) Ltd	55	dsl-elec	3310	National 1320-UE	3310	22,000/5"
VERDIGRIS						
Cactus Drlg Corp Ltd	11	dsl	350	M-CSCO	350	6,500
VERGR						
Westburne Drlg (Canada) Ltd	38	dsl	310	Failing 2500	160	3,000/3½"
VERMILION						
Tri-City Drlg (1968) Ltd	5	dsl	250	Failing 2500	210	3,000/3½"
WAINWRIGHT						
Tri-City Drlg (1968) Ltd	9	dsl	300	Dreco 300	300	4,500
WASHAHIGAN						
Adeco Drlg & Engr Co Ltd	3	dsl	308	National T-32	320	1,985
WATERTON						
Regent Drlg Ltd	8	dsl	1800	Gardner-Denver 1100	2100	15,000
WEMBLY						
Cactus Drlg Corp Ltd	6	dsl	900	Cardwell AO	900	9,500
WHITE COURT						
Regent Drlg Ltd	24	dsl	840	Brewster N-7	560	9,500
WILD RIVER						
Cactus Drlg Corp Ltd	26-E	dsl-elec	2700	Emsco D-3	500	18,000
Westburne Drlg (Canada) Ltd	20	dsl	1950	M-CSCO U-1220-D	1950	20,000/5"
WILDHAY						
Kenting Drlg Ltd	27	dsl	1040	National 610	1040	11,500
WILSON CREEK						
Westburne Drlg (Canada) Ltd	9	dsl	520	National T-45	460	8,500
WINDFALL						
Kenting Drlg Co Ltd	11	dsl	1200	M-CSCO U-40	1200	14,000
	2	dsl	1200	M-CSCO U-40	1200	14,000
	7	dsl	720	Emsco GC-500	720	10,500
WISKEY						
Peter Bawden Drlg Serv Ltd	33	dsl	1850	OILWELL 860	1400	18,000/5"
ZAMA LAKE						
Guthrie McLaren Drlg Ltd	11	dsl	450	Dreco 500	450	7,000
BRITISH COLUMBIA						
UNDESIGNATED						
Baltic Drlg Ltd	12	dsl	525	National T-32	326	7,500
	25	dsl	475	National T-20	326	6,500/4"
Can-Tex Drlg & Expl Ltd	7	dsl	900	Emsco G-50052	900	10,000
Challenger Drlg	1	dsl	1200	Emsco GC-500	1010	12,000
	22	dsl	2000	National 110	1800	19,000/5"
	50	dsl	2000	National 110	1800	19,000/5"
	6-E	dsl-elec	1400	National 80-E	2250	14,500/5"
Garnett Drlg Ltd	8	dsl	300	OILWELL 52-T	400	6,000/4"
Hi Tower Drlg Div Bow Valley	12	dsl	570	National T-32	310	6,000
	14	dsl	370	OILWELL 52-T	280	6,500
	15	dsl	580	National T-32	310	[illegible]
	2	dsl	900	OILWELL 66	600	8,500
Loffland Bros Co	198	dsl	1400	M-CSCO U-914-A	1599	15,000
	3	dsl	1850	M-CSCO U-914-A	2880	18,000
	72	dsl	1700	M-CSCO U-914	2880	18,000
	9	dsl	2000	M-CSCO U-914	1980	20,000
Montgomery Drlg Canada Ltd	42	scr	1300	National 110-UE	1800	2,100
BRITISH COLUMBIA (Cont'd)						
UNDESIGNATED						
Montgomery Drlg Canada Ltd	43	scr	1000	National 110-UE	1800	2,100
	44	dsl	2000	OILWELL 96	2400	20,000/5"
	48	dsl	1500	National 110	2400	18,000/5"
Nabors Drlg Ltd	3	dsl	1700	OILWELL 76	1326	14,000
	6	dsl	300	Ideco H-35	300	6,000
	8	dsl	740	Emsco GA-500	770	8,500
Parker Drlg Co	122-HH/11	dsl	1500	OIME TBA-1500	1700	17,000
	94	dsl	1700	National 100-M	1500	18,000
Red Arrow Drlg Ltd	6	dsl	225	RAD 200	275	6,000
	8	dsl	225	RAD 200	275	6,000
	9		225	RAD 200	275	6,000
CAMERON						
Westburne Drlg (Canada) Ltd	14	dsl	1080	National 50-A	1080	9,500
CHETWYND						
Kenting Drlg Co Ltd	22	dsl-elec	2000	National 80-UE	1000	13,000
Mustang Drlg	7-UE	dsl-elec	2400	National 80-UE	2400	15,000/5"
FORT ST JOHN						
Adeco Drlg & Engr Co Ltd	1	dsl	308	National T-20	320	1,680
	6	dsl	1500	National 100-M	2340	18,000
Argus Drlg Div of Taro Industries Ltd		dsl	1100	OILWELL 76	750	12,500
Guthrie McLaren Drlg Ltd	1	dsl	300	OILWELL 52-T	400	7,000
Jomax Drlg Ltd	2	dsl	800	OILWELL 52-T	455	2,600
Regent Drlg Ltd	30	dsl	280	Brewster N-4	280	6,500
Westburne Drlg (Canada) Ltd	17	dsl	1080	Emsco GB-350	720	8,000
	22	dsl	1010	National 50-A	700	8,500/5"
	26	dsl	360	National T-32	360	7,000
GRIZZLY						
Mustang Drlg	9-UE	dsl-elec	2745	National 110-UE	2745	20,000/5"
MOBERLY						
Adeco Drlg & Engr Co Ltd	5	dsl	1380	OIME Helihoist 1500	2000	17,000
MONIAS						
Regent Drlg Ltd	26	dsl	280	Ideco H-40	280	7,500
	27	dsl	560	Brewster N-4	280	6,500
	3	dsl	840	Brewster N-7	560	9,500
FORT ST JOHN						
Guthrie McLaren Drlg Ltd	4	dsl	375	Dreco D-500	450	6,000
NIG						
Kenting Drlg Co Ltd	1	dsl	1500	National 80-B	1500	14,500/5"
OJAY						
Kenting Drlg Co Ltd	21	dsl-elec	2000	National 80-UE	1000	15,000/5"
OKOTOKS						
Mustang Drlg	4	dsl	1200	National 55	1200	12,000
SIERRA						
Regent Drlg Ltd	2	dsl	840	Brewster N-55	460	9,500
UNDESIGNATED						
Challenger Drlg	55	dsl	1700	National M-100-HD	1800	15,000/5"
WHITCOURT						
Nugget Drlg Ltd	8	dsl	1100	National T-45	600	10,000
MANITOBA						
UNDESIGNATED						
Sedco Drlg Div of Bow Valley	90	dsl	300	M-CSCO U-34-D	330	5,500
NORTHWEST TERRITORIES						
UNDESIGNATED						
Parker Drlg Co	99-HH/6	dsl	1500	OIME Helihoist 1500	1700	17,000
HAY RIVER						
Mustang Drlg	12	dsl	1845	National 80-B	1845	14,000
KING CHRISTEN ISLAND						
Adeco Drlg & Engr Co Ltd	4	dsl	1380	Helihoist 1500	2000	17,000
NORMAN WELLS						
Simmons Drlg Ltd	6	dsl	440	Hycalog HH-6000	440	7,000
YUKON						
Nabors Drlg Ltd	9	dsl	2000	National 110	2400	18,000/5"
ONTARIO						
LAMBTON						
Corunna Petr Ltd	2	dsl	475	Ideco 525	636	8,500
	3	dsl	950	Hopper GXXTA	700	5,500
QUEBEC						
FORT MACLEOD						
Regent Drlg Ltd	23	dsl	840	Brewster N-7	560	9,500

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
QUEBEC (Cont'd)						
RIVIERE DE LOUP						
Regent Drlg Ltd	6	dsl	1400	Brewster N-75	1400	14,000
SASKATCHEWAN						
UNDESIGNATED						
Bird Oil Equipment Ltd	2	dsl		Emsco 250	300	6,500
Precision Drlg Ltd	2	dsl	350	Ideco H-20-AD	350	4,500
Sarcee Drlg	7	dsl	250	Unit U-34	230	5,000
Sedco Drlg Div of Bow Valley	84	dsl	300	Superior 300	290	4,500
	85		300	Superior 300	290	4,500
	87	dsl	300	Cardwell Model L	350	4,500/3½"
	91	dsl	330	Emsco GB-250	360	6,500
	94	dsl	300	Cardwell Model L	280	4,500
	96	dsl	300	Ideco H-25 Double Drum	240	4,500
	98	dsl	330	National T-20	330	6,000
CATHKIN						
Bow Island Drlg	12	dsl-elec	300	Cabot 1287	450	5,000
SASKATCHEWAN (Cont'd)						
CLARESHOLM						
Mustang Drlg	1	dsl	930	Unit 36-A	800	8,500/4"
ESTEVAN						
S & T Drlg (Northern) Ltd	8	dsl	1500	National 610	1500	11,500
LASHBURN						
Bow Island Drlg	4	dsl	278	Walker-Neer 2000	278	3,000/3½"
	5	dsl	3000	Walker-Neer 2000	278	3½"
LLOYDMINSTER						
Guthrie McLaren Drlg Ltd	6	dsl	300	Failing 2500-A	225	3,000/3½"
PARKMAN						
Simmons Drlg Ltd	4	dsl	440	OILWELL 52-1	440	6,000
STEELMAN						
Simmons Drlg Ltd	3	dsl	440	M-CSCO U-34	440	6,500

International Rotary (Land) Drilling Contractors

ALADDIN-MIDDLE EAST LTD 809 Petroleum Club Bldg Wichita KS 67202 316-265-9602
ALFOR 1910 North Akard Dallas TX 75202 214-653-8700
ARAB DRLG & WORKOVER CO P O Box 1401 Orange CA 92668 714-558-1300
ASTRAFOR SAIC Tucuman 117 8 Piso Buenos Aires Argentina
BAWDEN DRLG INC 4544 Post Oak Place Dr Houston TX 77027
BAWDEN DRLG INTL LTD JL LT Jen M T Haryond 58 Jakarta Selatan Indonesia 586603
BELCO PETROLEUM CORP OF PERU Casilla 3153-AV Las Lncas 460 Lima Peru 212-644-2200
BLOCKER INTL 800 Berring Drive Suite 400 Houston TX 77057 713-972-2030
BOLDON DRLG LTD Cleadon Lane E Boldon Tyne & Wear England 0783-368418
BRIDA SAPIC Sarmiento 663 1316 Buenos Aires Argentina 011/54/1/46/4036
CHALLENGER DRLG 220-444 7th Ave SW Calgary AB Canada T2P 0X8 403-269-3121
COMPANIA GEN DE SONDEOS SA Corazon Demaria No 15 Madrio Victoria Spain 4-16-85-50
COMPANIA NAVIER PEREZ COMPANC Florida 234-3 Piso Buenos Aires Argentina 46-4081/9
CONSTRUCTORA Y PER LATINA SA Paseo De La Reforma 243-70PIS Mexico 5 D F Mexico
CONTINENTAL DRLG & DEV 5-7 VRSS Constantinou Athens Greece
COSIFOR 90 Avenue Des Ternes 75017 Paris France
DEUTSCHE TIEFBOHR AG Postfach 75 4444 Bentheim W Germany 05922/721
EGYPTIAN DRLG CO P O Box 71 Nasr City Cairo Egypt 600230
FORAMINES 55 Rue De Chateaudun 75009 Paris France
FORASOL 16 Bis Rue Grange Dame Rose Velizy Villacouly Sevres 92 310 France 946-97-17
FOREX - NEPTUNE 20 Avenue Rapp BP 111 07 75326 Paris Cedex France 555-95-34
GEOPROSCO INTL LTD P O Box 938 Abu Dhabi United Arab Emirates 0534 35521
HELMERICH & PAYNE CA Apartado 16 Anaco Edo Anzoategui Venezuela 082-2-2691
HOULDER MARINE DRLG LTD 53 Leadenhall St London EC3A 2BR England
ITAG-CELLE P O Box 114 3100 Celle W Germany
INTERNATIONAL DRLG CO BV P O Box 2765 Houston TX 77063 713-871-7500
KCA DRLG LTD 9th Floor Berkeley House London WI England 491-3958
KENTING DRLG SERV LTD Unit 6 Ruddington Lane Wilford Nottingham NG11 7BY England 860266
KUWAIT DRLG CO P O Box 1401 Orange CA 92668 714-558-1300
LOFFLAND BROS CO P O Box 2847 Tulsa OK 74101 918-622-9330
NATIONAL DRLG CO P O Box 4017 Abu Dhabi UAE 820330AUN
NICKLOS DRLG CO P O Box 752 Eunice LA 70535 713-658-8245
O'CONNOR & YOUNG DRLG CO 1980 So Post Oak Rd Suite 2380 Houston TX 77056 713-961-1107
OIL DRLG & EXPL LTD Level 36 AMP CNT 50 Bridge S Sydney NSW 2000 Australia 232-2066
OILSER LTD 7 Avenue De L'Europe Sevres 92 310 FRA 534-75-20
ORKUSTOFNUN STATE DRLG CONTRS Grensasveg 9 108 Reykjavik Iceland
PARKER DRLG CO 8 E Third St Tulsa OK 74103 918-585-8221
PERFORADORA MEXICO SA Insurgentes 432 9th Floor Mexico City 7 D F Mexico
POOL ARABIA LTD P O Box 4271 Houston TX 77210 713-780-4999
POOL CO 2077 So Gessner Road Houston TX 77063 713-780-4999
POOL-INTAIRDRIL 2077 So Gessner Road Houston TX 77063 713-780-4999
POOL-INTAIRDRIL LTD 2077 So Gessner Road Houston TX 77063 713-780-4999
PREUSSAG AKTIENGESELLSCHAFT Postfach 1628-3150 Peine W Germany (0511) 19321
RBI DRLG LTD 3-Ashford 901 Threadneedle Suite 200 Houston TX 77079 713-496-5000
RICHTER DRLG PTY LTD P O Box 2197 Brisbane Queensland 4001 Australia
SAIPEM SPA P O Box 4159 San Donato Milane 20100 Milano Italy 02 53531
SANTA FE DRLG CO P O Box 1401 Orange CA 92668 714-588-1300
SEDCO INTL SA P O Box 833 Tehran Iran 621015-6
SKINNER DRLG CONTRACTORS LTD P O Box 46 San Fernando Trinidad W Indies 65-77265
WELL SERV LTD P O Box 152 San Fernando Trinidad W Indies
WESTBURNE INTL DRLG LTD P O Box 1558 Hamilton 5 Bermuda 809-292-3536

International Contract Rotary (Land) Drilling Rigs

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
AFRICA						
ALGERIA						
ALFOR	10	dsl-elec	1000	OILWELL 660	700	10,000
	5	dsl-elec	1000	OILWELL 660	700	10,000
	6	dsl-elec	1000	OILWELL 660	700	10,000
	7	dsl-elec	1000	OILWELL 660	700	10,000
	8	dsl-elec	1000	OILWELL 660	700	10,000
	9	dsl-elec	1000	OILWELL 660	700	10,000
	ALFOR I	dsl-elec	3400	OILWELL 2000	2000	20,000
	ALFOR II	dsl-elec	3400	OILWELL 2000	2000	20,000
	ALFOR III	dsl-elec	2800	OILWELL 840	2000	16,000
	ALFOR IV	dsl	1000	OILWELL 660	700	10,000
	ASH 12	dsl-elec	2800	OILWELL E-2000	2000	20,000
	ASH 13	dsl-elec	2800	OILWELL E-2000	2000	20,000
	ASH 14	dsl-elec	2800	OILWELL 840-E	2000	16,000
	ASH 15	dsl-elec	3200	Gardner-Denver 2100-E	2000	24,000
	ASH 16	dsl-elec	3200	Gardner-Denver 2100-E	2000	24,000
	ASH II	dsl-elec	2800	OILWELL E-200	2000	20,000
	ASH 17	dsl-elec	3200	OILWELL 840-E	2000	24,000
	ASH 18	dsl-elec	3200	OILWELL 840-E	2000	24,000
	ASH 19	dsl-elec	3200	OILWELL 840-E	2000	24,000
	ASH 20	dsl-elec	3200	OILWELL 840-E	2000	24,000
	ASH 21	dsl-elec	3200	OILWELL 840-E	2000	24,000
	ASH 22	dsl-elec	2000	OILWELL 840-E	2000	24,000
AFRICA (Cont'd)						
ALGERIA (Contd)						
FOREX Neptune &/or Affiliates	GD-1100/3	dsl-elec	3200	Gardner-Denver 1100	1500	18,000/5"
	GD-2100/5	dsl-elec	3200	Gardner-Denver 2100-RE	3000	25,400/5"
	S-7-11/20	dsl	2850	Ideco Super 7-11	1200	18,000/5"
	S-7-11/23	dsl	3200	Ideco Super 7-11	1200	18,000/5"
	GD-1500/3	dsl-elec	3200	Gardner-Denver E	2000	21,700/5"
Oilser Ltd	6	dsl-elec	2600	National 110-UE	1850	15,000
	8	dsl-elec	2600	National 110-UE	1850	15,000
Parker Drlg Co	129-HH/17	dsl	1500	OIME TBA-2000	1700	20,000
	133-HH/21	dsl	1500	OIME TBA-2000	1700	20,000
	140-HH/28	dsl	1500	OIME TBA-2000	1700	20,000
	144-HH/30	dsl	1500	OIME TBA-2000	1700	20,000
	145-HH/31	dsl	1500	OIME TBA-2000	1700	20,000
	146-HH/32	dsl	1500	OIME TBA-2000	1700	20,000
	154-HH/35	dsl	1500	OIME TBA-2000	1700	20,000
	155-HH/26	dsl	1500	OIME TBA-2000	1700	20,000
	156-HH/36	dsl	1500	OIME TBA-2000	1700	15,000
	160	dsl	1500	OIME TBA-2000	1700	20,000
SAIPEM	91	dsl-elec	3200	National 110-UE	1500	20,000
	92	dsl-elec	3200	National 110-UE	1500	20,000
	93	dsl-elec	3200	National 110-UE	1500	20,000
	94	dsl-elec	3200	National 110-UE	1500	20,000

AFRICA (Cont'd)

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
ALGERIA (Contd)						
SAIPEM	95	dsl-elec	3200	National 110-UE	1500	20,000
Westburne Intl Drlg Ltd	208	dsl-elec	3975	Emsco C-1-11	1500	18,000
	209	dsl-elec	3975	Emsco C-1-11	1500	18,000
	207	dsl-elec	3975	National 110-UE	1500	18,000
	206	dsl-elec	3975	A-800-E	1500	18,000
EGYPT						
Egyptian Drlg Co	1	dsl		National 110-UE		16,000/5"
	2	dsl		Frank Cabot SD-2346		12,000
FOREX Neptune &/or Affiliates	N-110/7	dsl	3200	National 110	1600	19,000/5"
Santa Fe Drlg Co	64	dsl	1800	National 110	1800	16,000
	69	dsl-elec	2000	National 1320-DE	3400	20,000
	73	dsl	2000	National 110	1800	16,000
GABON						
Forasol	1	dsl-elec	1200	Ideco H-525	800	9,000
	5	dsl-elec	2600	National 110-UE	1850	15,000
LIBYA						
Arab Drlg and Workover Co	118	dsl	1250	Ideco H-525	700	9,000
	37	dsl	1550	National 80-B	1800	12,000
	53	dsl	1250	Ideco H-525	700	9,000
	54	dsl	1400	National 80-B	1800	12,000
Challenger Drlg	19	dsl	1400	National 80-B	1500	15,000
Deutsche Tiefbohr Deutag	T-26	dsl	2550	Ideco Super 7/11	1500	16,000
	T-16	dsl	2000	Emsco A-800	1000	12,000
FOREX Neptune &/or Affiliates	N-80-UE/2	dsl	2000	National 80-UE	1000	15,700/5"
	DS-1	dsl	1200	Ideco H-525	640	9,000/5"
	GD-1100/5	dsl-elec	3200	Gardner-Denver 1100-E	1600	1,800/5"
	N-110/6	dsl	2600	National 110	1600	19,000/5"
	N-80/3	dsl-elec	2000	National 80-UE	1000	15,700/5"
	S-7-11/13	dsl	2500	Ideco Super 7-11	1200	18,000/5"
	S-7-11/2	dsl	2600	Ideco Super 7-11	1600	18,000/5"
	S-7-11/24	dsl	3200	Ideco Super 7-11	1600	18,000/5"
	S-7-11/8	dsl	3200	Ideco Super 7-11	1200	18,000/5"
International Drlg Co SA	39	dsl-elec	2000	Ideco ED-1200	1200	12,000
	19	dsl	1200	National 55-P	1700	9,000
	23	dsl	1455	National 80-B	1455	12,000
	8	dsl	2000	National 110	2250	13,000
	18	dsl	1455	National 80-B	1455	12,000
	21	dsl	1200	National 55-P	1700	9,000
KCA Drlg Ltd	100	dsl	320	Cardwell KM-250	320	3,000
	101	dsl	300	Franks Sahara	320	3,000
	102	dsl	320	Franks Sahara	320	3,000
	103	dsl	320	Franks Sahara	320	2,000
	83	dsl-elec	1000	M-CSCO U-36-EA	1000	10,000
Loffland Bros Co	168	dsl	2300	M-CSCO U-914	2300	15,000
Oil Drlg & Expl Ltd	7	dsl	2000	Ideco Super 7-11	2000	17,000
	9	dsl	2000	Ideco Super 7-11	2000	17,000
Pool Intairdril	204	scr	2000	Ideco ED-1200	1000	12,000
	205	dsl	2000	Ideco ED-1200	1000	12,000
	206	scr	2000	Ideco ED-1200	1000	12,000
	10	dsl	318	Franks 1058/120	318	5,000
	2	dsl	318	Franks 1287/120	476	5,000
	3	dsl	318	Franks 1287/120	476	5,000
	32	dsl	600	Cabot 750	600	6,500
	33	dsl	600	Cabot 750	600	6,500
	34	dsl	600	Cabot 750	600	6,500
	5	dsl	318	Franks 1058/120	318	5,000
NIGERIA						
FOREX Neptune &/or Affiliates	GB-250/5	dsl	750	Emsco GB-250	250	7,200/5"
	GD-2100/3	dsl-elec	3200	Gardner-Denver 2100-RE	3000	25,400/5"
	H-20	dsl	225	Ideco H-20	180	3,600
	H-525/4	dsl	1200	Ideco H-525	500	9,000
	N-110/10	dsl	2600	National 100	1600	19,000/5"
	N-110/4	dsl	2850	National 110	1600	19,000/5"
	N-110/5	dsl	2600	National 110/5	1600	19,000/5"
	N-110/11	dsl-elec	3200	National 110-UE	1500	19,000/5"
	S-7-11/19	dsl	2600	Ideco Super 7-11	1200	18,000/5"
	S-7-11/22	dsl	2600	Ideco Super 7-11	1200	18,000/5"
	S-7-11/26	dsl	2600	Ideco Super 7-11	1200	18,000/5"
Parker Drlg Co	197-HH/43	dsl	2000	OIME TBA-2000	2000	20,000
SAIPEM	38	dsl	2500	Ideco P Super 7-11	1590	16,500
	47	dsl	2130	Ideco P Super 7-11	1375	16,500
	50	dsl	1135	Ideco P H-40	432	4,800
	60	dsl	2500	Ideco P Super 7-11	1590	16,500
Sedco Intl SA	59	dsl	2800	OILWELL 860	2200	16,000
SOMALIA						
Parker Drlg Co	143	dsl	2000	National 110	3300	20,000
SUDAN						
Parker Drlg Co	105-HH/2	dsl	1200	OIME	1275	14,000
	119-HH/10	dsl	1500	OIME	1700	18,000
TUNISIA						
FOREX Neptune &/or Affiliates	GD-1100/6	dsl-elec	3200	Gardner-Denver	1600	1,800/5"
Oilser Ltd	7	dsl-elec	2600	National 110-UE	1850	15,000
SAIPEM	42	dsl	2250	Ideco P Super 7-11	1740	16,500
	46	dsl	2250	Ideco P Super 7-11	1740	16,500

AFRICA (Cont'd)

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
TUNISIA (Contd)						
Santa Fe Drlg Co	75	dsl	2000	National 1320-M	1800	20,000

AUSTRALIA

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
AUSTRALIA						
Pool-Intairdril	216	dsl		Wilson Super 38		3,400
Richter Drlg Pty Ltd	2	dsl	900	National 55	900	10,000
GILES						
Pool-Intairdril	17	dsl	100	Schramm	200	1,000
NEWMAN						
Pool-Intairdril	18	dsl	110	Schramm T-64-HB	275	
ODLEDA						
Pool-Intairdril	14	dsl	100	Schramm	200	1,000
PERTH						
Pool-Intairdril	11	dsl	235	Gardner-Denver 1000	235	1,000
	8	dsl	300	Gardner 15-W	300	1,500
QUEENSLAND						
Oil Drlg & Expl Ltd	12	dsl	1000	National 50	600	8,500
	8	dsl	350	Ideco H-35	500	4,500
Richter Drlg Pty Ltd	1	dsl	338	Sullivan 300-A	171	3,500
	7		1600	National 610	750	10,000
SOUTH AUSTRALIA						
Oil Drlg & Expl Ltd	10	dsl	1600	Ideco 1200	1600	14,000
	5	dsl	1100	Ideco Jr Super 7-11	1100	1,300
	6	dsl	1200	National 55	850	10,000
Richter Drlg Pty Ltd	10	dsl-elec	1500	National 110-UE	1500	17,000
	3	dsl	600	National T-32	300	5,500
UNDESIGNATED						
Pool-Intairdril	9	dsl	420	Franks Expl 1058-160	420	5,000
WESTERN AUSTRALIA						
Oil Drlg & Expl Ltd	15	dsl	2000	Ideco H-1700	2000	17,000
Richter Drlg Pty Ltd	4	dsl	600	National T-32	300	6,000
	9	dsl	2400	National 80-B	1600	12,000

CENTRAL AMERICA

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
COSTA RICA						
Foramines	4	dsl	850	Ideco H-525	700	25,000
EL SALVADOR						
Foramines	2	dsl	650	Emsco GB-250	500	28,000
	5	dsl	450	Fred Cooper TD-420-10	350	18,000
GUATEMALA						
Bawden Drlg Inc	5	dsl	2000	National 110-M	1500	18,000
Helmerich & Payne Intl Drlg Co	16	dsl-elec	1600	HS-2000	2000	18,000
	10	dsl-elec	1600	HS-2000	1500	18,000
Parker Drlg Co	185-HH/40	dsl	2000	OIME TBA-2000	2000	20,000

EUROPE

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
BELGIUM						
Foramines	1	dsl	1200	Emsco GB-800	800	36,000
	3	dsl	850	Salzgitter FB-415	740	27,000
	9	dsl	140	Salzgitter PS-150	160	400
DENMARK						
Deutsche Tiefbohr AG Deutag	T-1	dsl	490	Ideco BIR-800 H-1000	910	8,000
	T-14	dsl	2400	Emsco A-800	1000	14,000
FRANCE						
COSIFOR	E-350	dsl	1500	Emsco 350	550	9,000
	N-110	dsl	2500	National 110	1500	18,000
Foramines	8	dsl	250	Foramines RC-15	320	1,000
Forasol	1	dsl	1200	National 80-B	1850	12,000
	1	dsl		Ideco H-25	200	5,000
	1	dsl-elec	2600	Gardner-Denver 2100	2000	20,000
	1	dsl-elec	500	Ideco H-35	300	5,000
	1	dsl-elec	3200	National 1320-UE	2000	20,000
	2	dsl	2700	National 110	1850	15,000
	2	dsl	500	Emsco 160	250	4,000
	3	dsl-elec	3600	National 1625-DE	2400	20,000
FOREX Neptune &/or Affiliates	1100/1	dsl-elec	2900	Emsco 1100-DE	1500	18,000/5"
	800/2	dsl	2000	Emsco A-800	800	12,000/5"
	GC-500/1	dsl	1100	Emsco GC-500	500	10,800/5"
	H-25/2	dsl	375	Ideco H-25	250	4,400
	H-40/2	dsl	500	Ideco H-40	500	9,000
	H-525/3	dsl	1200	Ideco H-525	500	9,000
	N-55/2	dsl	1300	National 55	700	10,800
GERMANY						
Deutsche Tiefbohr AG Deutag	T-3	dsl	490	Ideco H-44-CD	590	5,000
	T-29	dsl-elec	2300	National 1320-ME	2000	18,000
	T-12	dsl	490	Ideco H-525-D	620	6,000
	T-2	dsl	490	Ideco H-525-D	620	6,000

EUROPE (Cont'd)

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
GERMANY (Contd)						
Deutsche Tiefbohr AG Deutag	T-4	dsl	500	Ideco H-30	425	6,000
	T-9	dsl	490	Ideco BIR-800 H-1000	910	8,000
	T-34	dsl	1650	Ideco BIR-800	950	8,000
	T-36	dsl	1650	Ideco BIR-800	950	8,000
	T-5	dsl	490	Ideco H-525-D	620	6,000
	T-7	dsl	1400	National 55	700	11,000
	T-8	dsl	490	Ideco BIR-800 H-1000	910	8,000
ITAG-CELLE	1	dsl	500	Wilson Mogul 42	600	9,500
	110-M	dsl	2600	National 110-M	1500	18,000
	2	dsl	1350	Wilson Mogul 42	250	8,000
	5	dsl	1600	Wilson Mogul 42	700	10,500
	ZA-312	dsl	500	SMG	250	4,500
Preussag Aktiengesellschaft	1	dsl	1100	Cabot Franks Model 2346	900	10,000
	2	dsl	1500	Cabot Franks Model 2346	900	10,000
	ZA-292	dsl	500	Salzgitter Maschinen AG	180	5,000
	GH-25	dsl	2600	Wirthoo GH-25	1500	16,000
	GH-35	dsl	2600	Demag GH-35	1500	17,500
ICELAND						
Orkustofnun State Drlg Contrs	DOFRI	dsl	1350	OILWELL 52-T	320	7,300
	GLAUMUR	dsl	290	Failing 2000	290	3,700/2⅞"
	JOTUNN	dsl-elec	1500	Gardner-Denver 700-E	750	145
	NARFI	dsl	580	Failing 3000	290	6,000/3½"
	YMIR	dsl	180	Mayhew 1000	180	1,800/2⅞"
ITALY						
Forasol	2	dsl-elec	1600	National 80-UE	1000	12,000
	3	dsl-elec	2600	National 80-UE	1000	12,000
Pool-Intairdril	211	scr	1300	Ideco 1700	2000	17,000
	212	scr	1300	Ideco 1200	1000	12,500
SAIPEM	3	dsl	1400	Ideco H-7-11	885	11,400
	36	dsl	2600	Ideco P 1350-S	1950	20,000
	44	dsl	109	Ideco P H-30	295	3,590
	52	dsl-elec	880	Ideco E-525	625	1,800
	56	dsl	1700	Ideco P Jr Super 7-11	1740	12,600
	58	dsl	1135	Ideco P H-40	432	4,800
	5898	dsl-elec	2600	Ideco HE-1700	1700	16,500
	6	dsl	440	Cardwell 02	590	8,100
	64	dsl-elec	2900	Emsco C-3 Type 2 Pot	3000	25,000
	72	dsl-elec	2600	National 1625	3000	25,000
	87	dsl-elec	3200	National 1625	3000	25,000
	88	dsl-elec	3200	National 1625	3000	25,000
	89	dsl	3200	Ideco E-3000	3000	30,000
	99	dsl	1400	Cardwell 03	1050	10,400
NETHERLANDS						
Deutsche Tiefbohr AG Deutag	T-32	dsl	380	Ideco BIR-3085 H-35-KD	300	3,000
	T-11	dsl	1700	National 30-B	1000	13,000
	T-19	dsl	2000	National 80-BE	1000	13,000
	T-30	dsl-elec	1000	Ideco E-725-D	600	6,000
	T-27	dsl-elec	2600	National 130	1625	16,000
PORTUGAL						
Foramines	6	dsl	280	Failing 2500	240	1,000
	7	dsl	350	Ideco H-25	350	15,000
SPAIN						
Compania Gen De Sondeos SA	110	dsl	3000	National T-2029	1700	19,700
	800	dsl	2400	Gardner-Denver	1470	14,800
	G-450	dsl	1050	Emsco G-450	450	10,000
Forasol	2	dsl-elec	3200	National 1320-UE	2000	20,000
	2	dsl-elec	3200	National 1625-DE	2000	20,000
	3	dsl-elec	3200	National 1320-UE	2000	20,000
UNITED KINGDOM						
Boldon Drlg Ltd	21	dsl	370	National T-20	290	4,500
	22	dsl	590	National T-20	335	5,500
	23	dsl	350	National T-20	280	4,000
	25	dsl	150	Failing 2500	260	2,500/3½"
	32	dsl	590	National T-32	500	7,000
	80	dsl-elec	800	National 80-UE	1000	14,000
FOREX Neptune &/or Affiliates	S-7-11/14	dsl	2200	Ideco Super 7-11	1200	18,000/5"
Houlder Marine Drlg Ltd	1	dsl-elec	1600	National 80-UE	1000	12,000
KCA Drlg Ltd	104	dsl		Franks 550	320	5,000
Kenting (UK) Ltd	12	dsl	350	Brewster N-45	350	8,000
	17	dsl	350	Stratmaster 90	350	5,000/3½"
	19	dsl	350	Gardner-Denver 3000	230	4,500/4"
	26	dsl	350	Cardwell TR-69	350	6,000

MEXICO

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
GUADALAJARA						
Construction Y Per Latina	PR-20	dsl		Failing 2500	160	2,500

MEXICO (Cont'd)

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
GUADALAJARA						
Constructora Y Per Latina SA	PC-5	dsl		Bucyrus Erie 36 LD-53	150	1,700
	PR-12	dsl		Failing 2500	160	2,500
	PR-9	dsl	165	Failing 1500	134	1,500
HIDALGO						
Constructora Y Per Latina SA	PT-17	dsl	1020	Emsco GA-500	500	6,500
	PT-18	dsl	1020	Emsco GB-500	500	6,500
MEXICO						
Constructora Y Per Latina SA	PT-16	dsl	1020	M-CSCO U-10	260	5,000
	PC-26	dsl		Walker-Neer FWN-40	80	1,700
	GT-34	dsl	1000	Emsco GB-800	1000	12,000
	PT-19	dsl	1100	Emsco J-750	750	9,500
	PC-30	dsl		Stenvic AS-5		300
	PR-11	dsl		Failing 2500	160	2,500
	PR-13	dsl		Failing 2500	160	2,500
	PC-29	dsl		Walker-Neer FWN-40	80	1,700
	GT-33	dsl	1000	Emsco GB-800	1000	12,000
	PC-25	dsl		Walker-Neer FWN-40	80	1,700
	PC-27	dsl		Walker-Neer FWN-40	80	1,700
	PC-3	dsl		Walker-Neer S-32-SP	110	1,700
	PC-20	dsl		Bucyrus Erie 36 LD-53	150	1,700
	PP-1	dsl		Walker-Neer WS-31	80	1,700
	PP-4	dsl		Walker-Neer S-32-SP	110	1,700
	PR-10	dsl		Failing 1500	180	[illegible],500
	PR-21	dsl		Failing 2500	160	2,500
	PR-7	dsl	308	Failing 1500	150	1,500
	PS-14	dsl	308	Emsco 250 Perlasa	250	3,000
	PS-15	dsl	308	Wagner-Morehouse M-41-AZ	180	3,000
	PS-31	dsl	308	Wagner-Morehouse M-41-AZ	180	3,000
	PP-2	dsl		Walker-Neer S-32-SP	125	1,700
Perforadora Mexico SA	Reforma	dsl-elec	5000	National 1625-DE	3000	25,000
	Revolucion	dsl-elec	5000	National 1625-DE	3000	25,000
	8	dsl-elec	2000	National 1320-UE	2000	2,600
PUEBLA						
Constructora Y Per Latina SA	PR-32	dsl		Failing 2500	160	2,500
	PC-28	dsl		Walker-Neer FWN-40	80	1,700
VILLAHERMOSA						
Perforadora Mexico SA	7	dsl-elec	2000	National 1320-UE	2000	2,600

MIDDLE EAST

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
ABU DHABI						
FOREX Neptune &/or Affiliates	GD-1100/4	dsl-elec	3200	Gardner-Denver 1100	1500	18,000/5"
	N-80-4	dsl-elec	1000	National 80-UE	1000	15,700/5"
Geoprosco Intl Ltd	35	dsl	375	Cardwell K-250-M	475	6,000
	36	dsl	600	Ideco H-900	725	10,000
	39	dsl		Ideco H-30	475	7,000/3½"
	40	dsl		Ideco H-30	475	7,000/3½"
	41	dsl	2200	Ideco H-900	1100	10,000
	42	dsl-elec	700	Ideco ED-900	1000	10,000
	43	dsl-elec	700	Ideco ED-900	1000	10,000
National Drlg Co	1	dsl-elec	3000	OILWELL E-840	1500	17,500
	2	dsl-elec	3000	OILWELL E-840	1500	17,500
Pool-Intairdril	213	scr	900	Ideco 900	1000	10,500
	214	scr	900	Ideco 900	1000	10,500
	215	scr	900	Ideco 900	1000	10,500
Westburne Intl Drlg Ltd	212	dsl-elec	5300	National 110-UE	1500	18,000
	213	dsl-elec	5300	National 110-UE	1500	18,000
	210	dsl-elec	5300	National 1320-UE	1500	20,000
BANGLADESH						
Po[illegible] Drlg Co	195-HH/42	dsl	2000	OIME TBA-2000	2000	20,000
DUBAI						
Sedco Intl SA	95	dsl-elec	2800	National 1320-UE	4950	20,000
IRAN						
Pool Intairdril Ltd	21	dsl	318	Franks 1287/120	476	5,000
	24	dsl	600	Cabot 750	650	7,500
	25	dsl	600	Cabot 750	650	7,500
	26	dsl	600	Cabot 750	650	7,500
	27	dsl	600	Cabot 750	650	7,500
SAIPEM	37	dsl	2600	Ideco P 1350-S	1950	20,000
Santa Fe Drlg Co	96	dsl-elec	2800	OILWELL E-2000	1500	20,000
	98	dsl-elec	2800	OILWELL E-2000	2000	20,000

MIDDLE EAST (Cont'd)

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
IRAQ						
FOREX Neptune &/or Affiliates	GD-1100/2	dsl-elec	3200	Gardner-Denver 1100	1500	18,000/5"
	GD-2100/4	dsl-elec	3200	Gardner-Denver 2100-RE	3000	25,400/5"
	GD-2100/21	dsl-elec	3200	Gardner-Denver	2300	25,400/5"
	GD-2100/22	dsl-elec	3200	Gardner-Denver 2100	2300	25,400/5"
	H-525/9	dsl	1000	Ideco H-525	500	9,000
	S-7-11/15	dsl	3200	Ideco Super 7-11	1200	18,000/5"
SAIPEM	48	dsl	2600	Ideco P Super 7-11	1740	16,500
	49	dsl	2600	Ideco P Super 7-11	2100	16,500
	55	dsl	1800	Ideco P Jr Super 7-11	1740	12,600
	5863	dsl-elec	2800	OILWELL E-2000	2000	20,000
	63	dsl-elec	3200	National 110-UE	1500	20,000
	70	dsl-elec	3200	National 1625	3000	25,000
Westburne Drlg (Canada) Ltd	214	dsl-elec	2900	National 110-UE	1500	18,000
KUWAIT						
Arab Drlg & Workover Co	ADWOC-2	dsl-elec	2600	Emsco C-111	1500	20,000
	ADWOC-3	dsl-elec	2600	Emsco C-111	1500	20,000
Kuwait Drlg Co	KDC-5	dsl-elec	1700	Gardner-Denver 800-E	800	12,000
	KDC-7	dsl-elec	1700	Gardner-Denver 800-E	800	12,000
	KDG-6	dsl-elec	5100	OILWELL E-3000	3000	30,000
Parker Drlg Co	189	dsl-elec	3200	OIME 3000-E	3000	30,000
OMAN						
Deutsche Tiefbohr AG	T-33	dsl	1600	National 55	700	11,000
	T-18	dsl	2600	National 55	700	11,000
	T-17	dsl-elec	2700	National 1320	1800	18,000
FOREX Neptune &/or Affiliates	1200	dsl	1800	Ideco Junior 1200	1400	16,500/5"
Sedco Intl SA	[illegible]4	dsl-elec	2100	National 80-B	1100	12,000
	76	dsl	2000	OILWELL 760	1000	12,000
PAKISTAN						
Sedco Intl SA	96	dsl	2000	OILWELL 860	2200	16,000
QATAR						
Deutsche Tiefbohr AG Deutag	T-6	dsl	490	Ideco BIR-800 H-1000	910	8,000
Santa Fe Drlg Co	89	dsl-elec	2000	National 110-UE	1800	16,000
	91	dsl-elec	2000	National 110	3300	16,000
	93	dsl	1700	National 80-B	3300	12,000
RAS AL-KHAYMAH						
Santa Fe Drlg Co	97	dsl-elec	2800	OILWELL E-2000	1500	20,000
SAUDI ARABIA						
International Drlg Co SA	37	dsl-elec	2000	Ideco ED-1200	1200	13,000
Pool Arabia Ltd	15	dsl	420	Ideco DIR-550	420	6,500
	190	dsl	550	Pool	700	7,500
	191	dsl	550	Pool	700	7,500
	201	dsl	1400	OILWELL	1000	3,000
	202	dsl	1400	OILWELL	1000	12,000
	203		1400	OILWELL	1000	12,000
	23	dsl	300	Ideco H-40	450	8,000
	29	dsl	420	Franks Expl 1058	420	6,000
	40	dsl	600	Cabot 700	600	6,500
	128	dsl	230	Franks Expl III	450	6,500
	138	dsl	450	Cabot	450	6,500
Pool-Intairdril	22	dsl	400	Ideco DIR-550	400	6,500
Santa Fe Drlg Co	101	dsl-elec	2600	National 110-UE	1500	16,000
	102	dsl-elec	2400	National 110-UE	1500	16,000
	104	dsl-elec	3400	National 110-UE	1500	16,000
	109	dsl-elec	2000	National 110-UE	1800	16,000
	67	dsl-elec	2400	National 1320-DE	3400	20,000
	70	dsl-elec	2000	National 1320-DE	3400	20,000
	90	dsl-elec	2000	National 1320-DE	2000	20,000
	92	dsl-elec	2800	National 1320-UE	1400	20,000
	93	dsl-elec	1700	National 80-UE	700	12,000
	94	dsl-elec	2250	National 110-UE	2000	16,000
	99	dsl-elec	2800	OILWELL E-2000	1500	20,000
SHARJAH						
Sedco Intl SA	97	dsl	2700	OILWELL 860	2200	16,000
SYRIA						
Continental Drlg & Dev	1	dsl	1000	National 80-S	1400	10,000
Parker Drlg Co	194-HH/41	dsl	2000	OIME TBA-2000	2000	20,000
TURKEY						
Aladdin-Middle East Ltd	1	dsl	1285	Bethlehem M-58	1000	12,000
KCA Drlg Ltd	71	dsl	2580	National 80-B	1540	12,000

SOUTH AMERICA

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
ARGENTINA						
Astrafor SAIC	1	dsl	1500	Emsco GC-350	800	10,000
	2	dsl	1500	Emsco GC-358	800	10,000
	3	dsl	1600	Emsco G-500	1000	12,000
	4	dsl	1500	Emsco GC-350	800	10,100
	6	dsl	1400	Ehideco BIR-800	800	8,000

SOUTH AMERICA (Cont'd)

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
ARGENTINA (Contd)						
Astrafor SAIC	8	dsl	1600	Emsco A-80	1000	12,000
	9	dsl	1400	Ideco BIR-800	800	8,000
Beta Drlg Inc	29	dsl	1000	Ideco H-40	500	6,500
Bridas SADIC	8	dsl	1650	Emsco A-800	1650	14,000
	11	dsl	1000	Emsco GC-350-T	600	8,500
	13	dsl	1000	Emsco GC-350-T	600	8,500
	23	dsl	1800	National 100	1000	18,000
	25	dsl	1250	National N-75	750	10,000
	27	dsl	1250	National N-75	750	11,500
	33	dsl	1500	Gardner-Denver 800	1000	12,000
	34	dsl	1000	Ideco H-40	500	6,500
	37	dsl	2550	Brewster N-95	2550	20,000
	39	dsl	1600	Gardner-Denver 800	1000	15,000
	52	dsl	900	Cardwell T-250	500	7,500
	53	dsl	900	Cardwell T-250	500	7,500
	54	dsl	900	Cardwell T-250	500	7,500
	55	dsl	900	Cardwell T-250	500	7,500
	56	dsl	600	Ingersoll Rand T-5	200	3,000
	7	dsl	1250	M-CSCO U-36-A	700	10,000
	9	dsl	1000	M-CSCO U-36-A	600	9,000
	Rio Colorado 1			National 1320-UE		20,000
	3	dsl	1250	M-CSCO U-36-A	700	10,000
Navier Perez Companc	37	dsl	1400	Cardwell KB-210	350	5,900
	42	dsl	1600	Gardner-Denver 700		10,000
	1	dsl	1400	Cardwell J-450	700	6,900
	2	dsl	1400	Cardwell J-450	700	6,900
	28	dsl	1600	Gardner-Denver 800	1050	12,000
	29	dsl	1600	Gardner-Denver 700	700	10,000
	3	dsl	1400	Cardwell J-450	700	6,900
	4	dsl	1400	Cardwell J-450	700	6,900
	5	dsl	1400	Cardwell KM-250	350	5,900
	6	dsl	1400	Cardwell KM-250	350	5,900
RBI Drlg Ltd	30	dsl	2700	National 110	3075	18,000
	31	dsl	2700	National 110	3075	18,000
SAIPEM	45	dsl	109	Ideco PH-30	295	3,590
	51	dsl-elec	1140	Ideco E-525	625	1,800
	5830	dsl-elec	2600	National 1320	2000	16,500
	5873	dsl	700	Ideco H-37/S	650	4,000
	5884	dsl		Ideco Pignone M-20-S	760	
	5896	dsl	2000	Ideco H-1200	1200	12,000
	66	dsl	440	Ideco PH-40	400	4,800
	67	dsl	1000	Ideco PH-40	400	4,800
	68	dsl	440	Ideco PH-40	400	4,800
	69	dsl	440	Ideco PH-40	400	4,800
	71	dsl-elec	2600	National 1625	3000	25,000
	77	dsl	400	Ideco PH-30	280	3,590
	78	dsl	400	Ideco PH-30	280	3,590
	79	dsl	440	Ideco PH-40	400	4,800
	80	dsl	1000	Ideco PH-40	400	4,800
	82	dsl		Ideco PM-20	160	
	83	dsl		Ideco PM-20	160	
BOLIVIA						
Helmerich & Payne CA	11	dsl-elec	1600	HS-1500	1500	18,000
	9	dsl-elec	1600	HS-1500	1300	18,000
BRAZIL						
Astrafor SAIC	5	dsl	1600	Emsco A-800	1500	14,000
	7	dsl	1600	Emsco A-800	1500	14,000
Compania Navier Perez Co	45		2600	Ideco 1700-E	1700	15,200
Naviera Perez Co	36	dsl	1600	Gardner-Denver 800	1050	12,000
	45	dsl-elec	2600	Ideco E-1700	1700	15,200
Parker Drlg Co	132-HH/20	dsl	1500	OIME TBA-2000	1700	20,000
	134-HH/22	dsl	1500	OIME TBA-2000	1700	20,000
	151-HH/34	dsl	1500	OIME TBA-2000	1700	20,000
COLOMBIA						
Bawden Drlg Inc	4	dsl-scr	2000	National 80-BE	1000	14,000
Helmerich & Payne De Colombia	7	dsl-elec	1200	HS-1500	1500	18,000
Parker Drlg Co	104	dsl	1400	National 50-A	1275	10,000
	110-HH/9	dsl	1500	OIME	1700	17,000
	158	dsl	1[illegible]00	National 80-B	1700	15,000
	80	dsl	2900	National 130	2900	25,000
Pool America Inc	208	dsl	2000	OIME	1000	12,000
	209	dsl	2000	OIME	1000	12,000
	210	dsl	400	Wilson DD-42-428	450	3,000
Pool-Intairdril	207	dsl	300	Pool 400	400	
ECUADOR						
Helmerich & Payne De Ecuador	12	dsl-elec	1600	HS-2000	1500	18,000
Parker Drlg Co	102-HH/1	dsl	1200	OIME	1275	12,500
	159	dsl	2200	OILWELL 76	1560	15,000
Pool America Inc	126	dsl	230	Wilson Mogul 42	450	6,500
PERU						
Belco Petr Corp of Peru	5	dsl	1000	DH-4610-38 Sky Top	1000	12,000

SOUTH AMERICA (Cont'd)

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
PERU (Contd)						
Beloo Petr Corp of Peru	2	dsl	1000	Skytop H-4210	700	6,000
	3	dsl	1000	National 55	700	9,000
	4	dsl	1000	National 80-B	1000	12,000
	6	dsl	1000	DH-4610 Skytop	1000	12,000
Blocker Intl	23	dsl	550	Ideco H-37	456	7,000
	21	dsl	550	Ideco H-37	456	7,000
	22	dsl	550	Ideco H-37	456	7,000
	24	dsl	550	Ideco H-37	456	7,000
Parker Drlg Co	107-HH/4	dsl	1200	OIME	1700	15,000
	108-HH/5	dsl	1500	OIME	1700	17,000
	109-HH/7	dsl	1500	OIME	1700	17,000
	127-HH/15	dsl	1500	OIME TBA-2000	1700	20,000
	131-HH/19	dsl	1500	OIME TBA-2000	1700	20,000
VENEZUELA						
Helmerich & Payne CA	1	dsl	500	Cardwell M-250	300	6,000
	2	dsl	500	Cardwell M-250	300	6,000
	28	dsl	1500	National 110	1500	18,500
	30	dsl	1200	Ideco H-525	1200	10,000
	31	dsl	1200	Ideco H-525	1000	10,000
	4	dsl	500	Cardwell M-250	300	6,000
	6	dsl	300	Ideco H-44	400	12,000/3½"
	67	dsl	1500	National 110	1500	16,000
	5	dsl	700	Ideco 525	300	7,000
Helmerich & Payne Intl Drlg Co	3	dsl	600	Ideco H-37	400	7,000
Loffland Bros Co	61	dsl	500	Ideco H-525	566	6,500
	62	dsl	480	Ideco H-525	566	6,500
	14	dsl	700	M-CSCO U-36-A	785	9,000
	24	dsl-elec	2000	National 100-E	2000	14,000
	41	dsl	2000	M-CSCO U-914-C	2000	20,000
	54	dsl-elec	2900	M-CSCO U-1220-EB	3300	28,000
	68	dsl-elec	3200	M-CSCO U-1220-EB	3300	28,000
	94	dsl-elec	2000	M-CSCO U-20-E	1900	16,000
Santa Fe Drlg Co	110	dsl-elec	2000	National 80-DE	2000	20,000
	115	dsl-elec	2000	National 1320-DE	3400	20,000
	117	dsl-elec	2800	OILWELL E-2000	2000	20,000
	119	dsl-elec	2800	OILWELL E-2000	2000	20,000
	125	dsl	800	Hopper GXTA	450	6,000
	15	dsl	800	Ideco 525	600	9,000
	16	dsl	600	National T-32	250	5,000
	17	dsl	350	Franks Expl	250	5,000
	18	dsl	900	Emsco GA-500	700	9,000
	2	dsl	1700	National 130	1800	20,000
	20	dsl	800	Ideco H-40-D	350	7,000
	21	dsl	1200	U-914-B	1800	20,000
	22	dsl	350	Ideco H-35	350	5,000
	24	dsl	350	Ideco H-35	350	5,000
	3	dsl	350	Wagner-Morehouse M-41	350	5,000
	8	dsl	2200	National 130	1800	20,000
	9	dsl	1850	National 130	1800	20,000

SOUTHEAST ASIA

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
BRUNEI						
Deutsche Tiefbohr AG Deutag	T-31	dsl	1000	Wilson	850	8,000
INDONESIA						
Bowden Drlg Inc	9	scr	3200	National 1320-UE	2000	22,000
Bowden Drlg Intl Ltd	28	dsl	925	Emsco GB-350	350	7,200
	29	dsl-elec	1400	National 80-BE	1000	12,000
	6	dsl	1000	National T-45	550	7,500
Loffland Bros Co	300	dsl	600	M-CSCO U-34	500	4,000
	56	dsl	900	M-CSCO U-36-A	900	10,000
	139	dsl	1400	M-CSCO U-36	900	10,000
O'Connor & Young Drlg Co	801	dsl	1600	National 610	850	12,000
Parker Drlg Co	106-HH/3	dsl	1200	OIME	1275	14,000
	115-HH/8	dsl	1500	OIME	1700	18,000
	125-HH/13	dsl	1500	OIME	1700	18,000
	126-HH/14	dsl	1500	OIME TBA-2000	1700	20,000
	130-HH/18	dsl	1500	OIME TBA-2000	1700	20,000
	153/187	dsl-elec	3200	OIME 3000-E	2000	24,000
	168	dsl-elec	3200	Emsco C-2	2000	24,000
	188-HH/38		2000	OIME TBA-2400	2000	24,000
	190-HH/39	dsl	1500	OIME TBA-2000	1700	20,000
Westburne Intl Drlg Ltd	216-H	dsl	1200	Howard Turner MT-38-H	400	5,000
	217-H	dsl	1200	Howard Turner MT-38-H	400	5,000
	205-H	dsl	600	T-12 Modified West Helihoist G	250	5,000
NEW ZEALAND						
Republic Mineral Corp	1	dsl	500	Failing 2500	160	2,500
PHILIPPINES						
Richter Drlg Pty Ltd	6	dsl	1800	National 100	1800	14,000
	8	dsl	1800	National 110-M	1800	14,000
THAILAND						
Parker Drlg Co	200-HH/44	dsl	2000	OIME TBA-2000	2000	20,000
YEMEN						
Deutsche Tiefbohr AG Deutag	T-10	dsl	2700	National 80-B	1000	13,000

WEST INDIES

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
TRINIDAD						
Skinner Drlg Contractor	14	dsl	325	Ideco H-25	171	3,500
	15	dsl	90	Cabot-Franks 1287-120 DTD	180	6,500/2⅞"
	16	dsl	180	Cabot-Franks 1287-120 DTD	240	15,200/2⅞"
	7	dsl	325	Ideco H-20	171	2,500
	17	dsl	1100	OILWELL 660	840	9,000
Well Serv Ltd	9	dsl-elec	2000	National 1320-UE	2000	20,000
	1	dsl	1400	National T-45	650	8,000
	2	dsl	1200	Gardner-Denver 500-M	650	9,000
	4	dsl	1000	M-CSCO U-34	600	6,000

AUCTION...

. . . WHO NEEDS IT?

YOU . . . IF YOU ARE:

1. Considering Retirement
2. Discontinuing Business
3. Dissolving Partnership or Corporation
4. Liquidating Joint Venture
5. Settling an Estate
6. Completing Project
7. Liquidating Surplus Equipment
8. "Just Plain Fed-Up"

WHAT ARE THE ADVANTAGES?

1. Sell for CASH to YOU!
2. Sell when YOU are ready!
3. Bring the buyers to YOUR market!
4. YOUR price determined by competitive bidding!
5. YOUR complete sale is over in a matter of hours!

YOU decide the time, place, and terms of the Sale.

Successful businessmen are continually letting the Proven Pros at Nelson help solve their problems! What about you?

For confidential consultation in the privacy of your office or ours contact:

BILL ARCHER – 214/561-1150

AUCTIONEERS • LIQUIDATORS • APPRAISERS

NELSON INTERNATIONAL

DALLAS / TYLER / CALGARY

Circle 316 on Reader Service Card

BEST AVAILABLE COPY

PETROLEUM ENGINEER International
International Land Rig Locator
P. O. Box 1589
Dallas, Texas 75221

ROTARY LAND DRILLING RIGS FORM

CONTRACTOR ______________________

HEADQUARTERS ADDRESS ______________________

Date: ______________________

______________________(ZIP CODE FOP U.S.)______________________

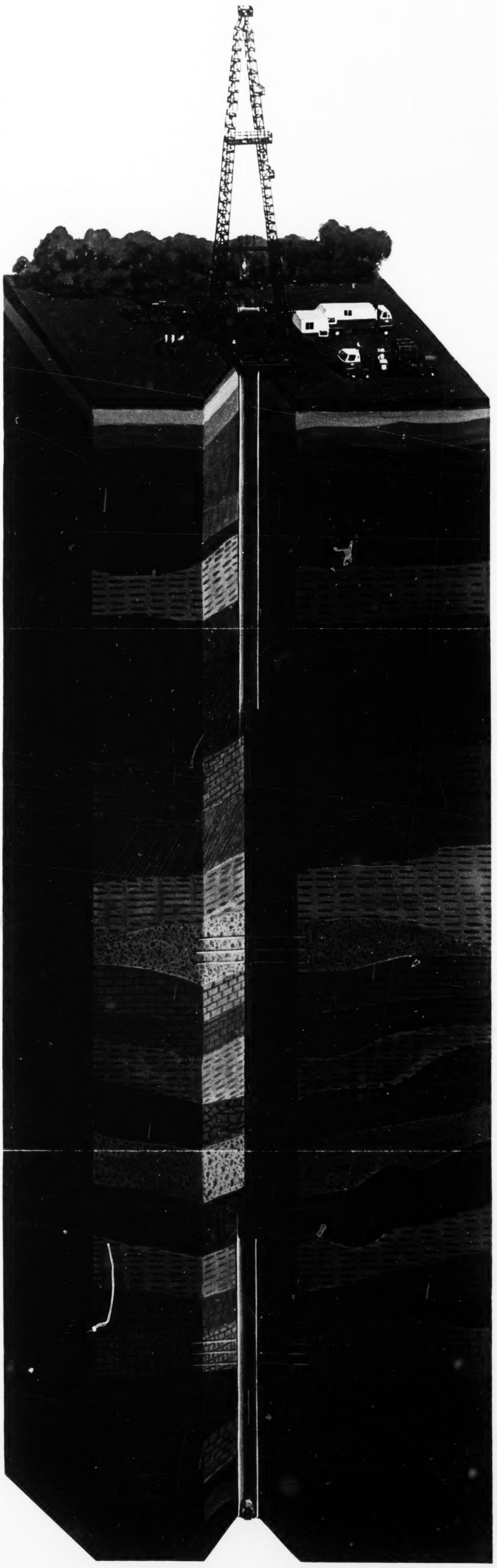
NAME/TITLE ______________________ PHONE ______________________

Rig. No or Name	Type Power (Diesel, Gas, Gasoline)	Primary Mud Pump Make & Model	Secondary Mud Pump Make & Model	Total HP to Mud Pumps	Drawworks Make and Model	Total HP Available To Drawworks	Rated Depth With 4½ In. Pipe	PRESENT LOCATION	
								County or Area	State and Country

PLEASE TYPE OR PRINT

DRESSER WORKS WITH YOU AT EVERY LEVEL.

Dresser is in the oil and gas business with you from top to bottom. And everywhere in between. We're in virtually every facet of energy exploration, development, production and field service. We're the energy industry's right arm. And we're ready to go to work with you. At every level.



IDECO is a leading manufacturer of drilling rigs, masts and structures, mobile units and heavy-duty pumps. We also have blocks, swivels, rotaries, plus accessories for all your drilling and well service needs. Ideco builds equipment you can believe in.

SWACO can provide you with the most complete line of surface equipment for fluid processing, rig instrumentation and pressure control. This equipment includes screen shakers, D-Sanders, D-Silters, D-Gassers, centrifuges, chokes, flow sensors, weight control recorders, plus penetration rate recorders. These are just a few of the reasons to specify Swaco.

DRESSER ATLAS is one of the most trusted names in wireline services. But we don't stop there. Perforations, well logging and completion services are just a few of the things that we can do for you. Locating, documenting and planning wells is Atlas's business.

MAGCOBAR supplies more drilling, workover, completion, packer and sealant muds than anyone else in the business. We also supply cementing services and DATA® monitoring. Covering the world with in-depth knowledge and materials isn't the only thing Magcobar does. We're also involved with water well drilling, geothermal exploration, mining activities, production chemicals and viscometers.

GUIBERSON packers, pumps, and swabbing equipment are known throughout the industry as leaders in completion, production and well servicing. In fact, you'll find Guiberson equipment on 90% of all well service and workover operations.

DRESSER TITAN is involved with well fracturing, acidizing and formation stabilization. With operations across the U.S. and Canada, complete with a full line of fracturing, acidizing products and equipment, as well as hydraulic horsepower pump units, this member of our family has made a name for itself. And that name is dependable.

SECURITY is noted for marketing the fastest penetrating bits in the industry. But did you know that we also manufacture and market a complete line of drilling tools? Tools like shock absorbers, reamers, stabilizers, hole openers, and soon, a line of drilling jars. We're equipped to supply your drill string needs all the way to touchdown. Now that's Security.

DRESSER ATLAS, GUIBERSON, IDECO, MAGCOBAR, SECURITY, SWACO AND DRESSER TITAN

DRESSER INDUSTRIES | DRESSER

9753-2

BEST AVAILABLE COPY

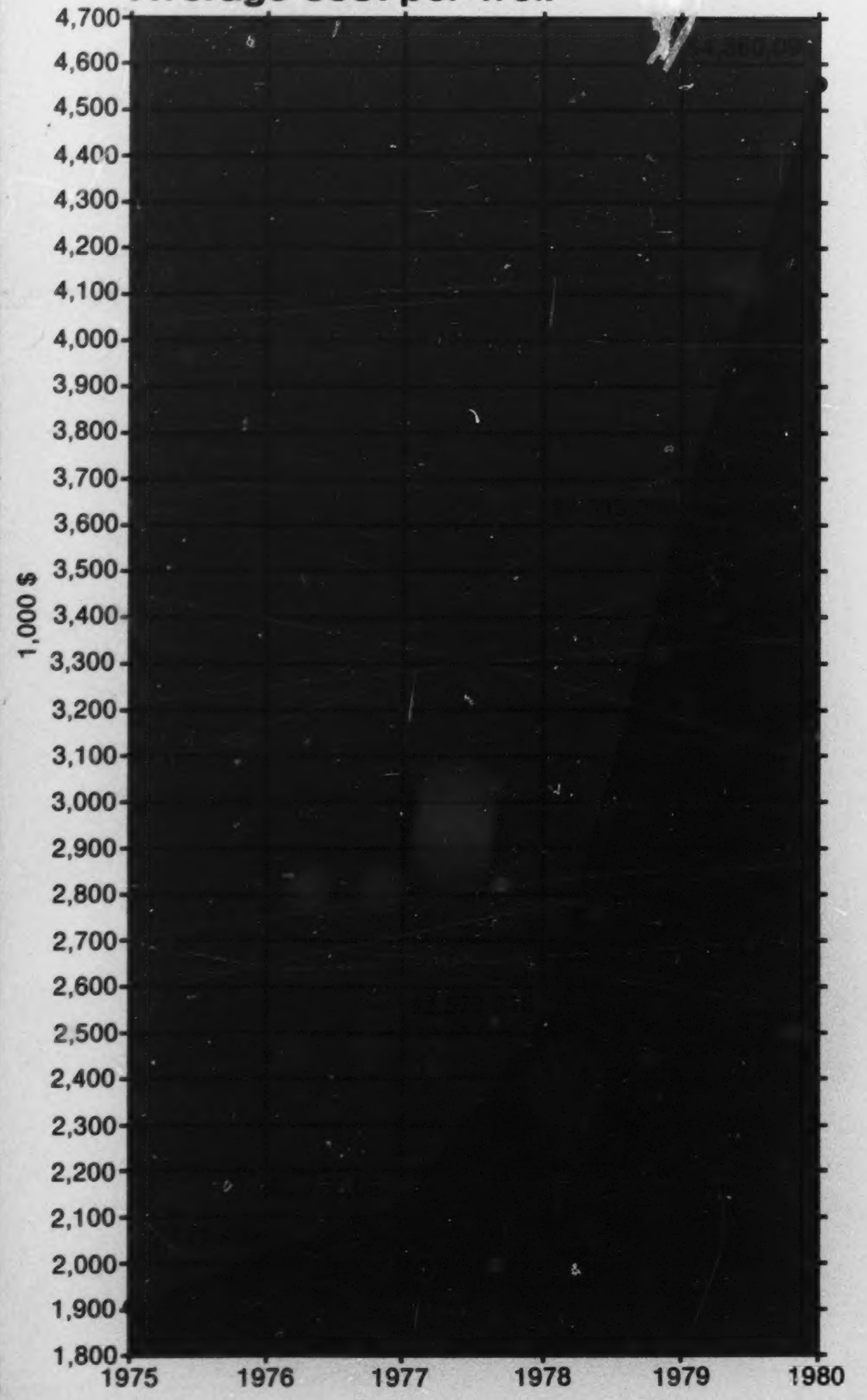
1980 U.S. Deep drilling 859 Deep wells

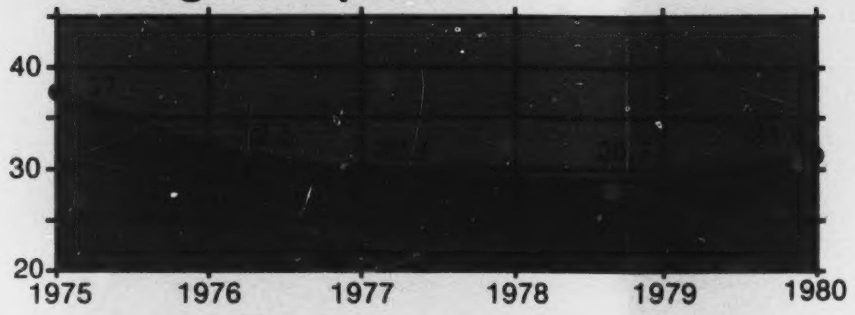
LAKE SUPERIOR
LAKE MICHIGAN
LAKE HURON
LAKE ERIE
LAKE ONTARIO
OKLAHOMA

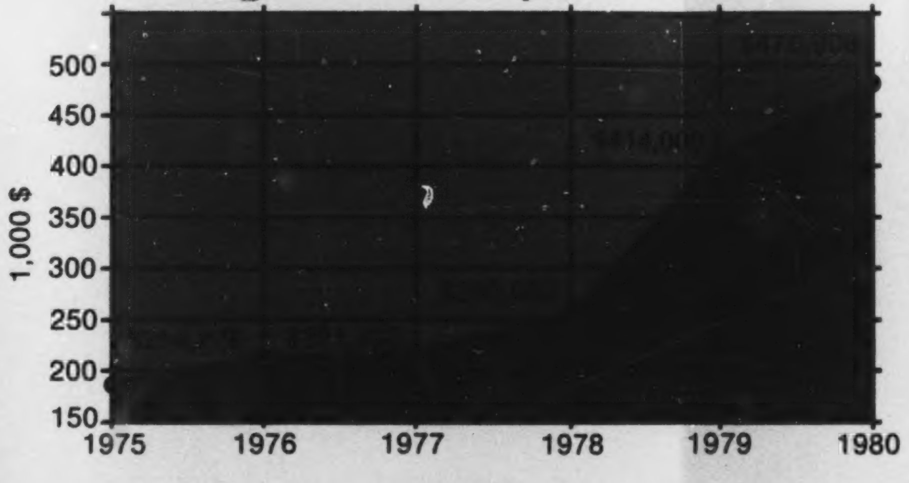
BEST AVAILABLE COPY

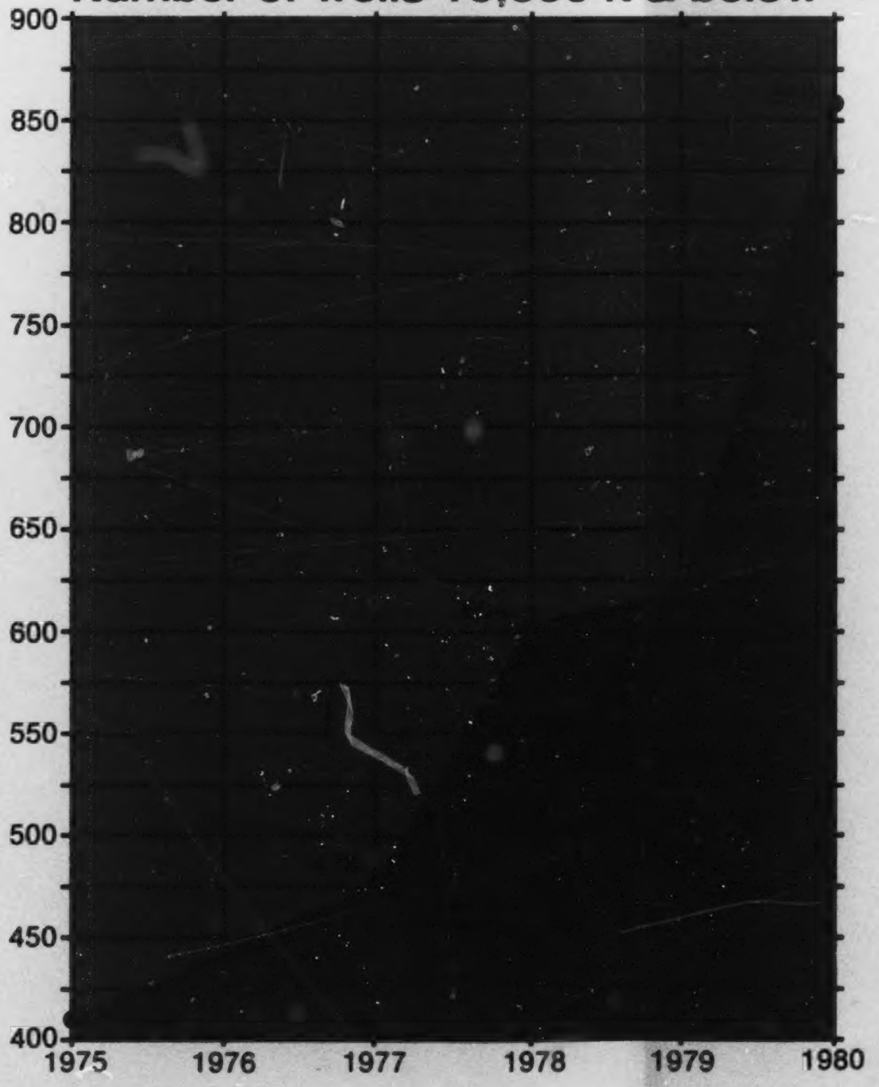
Based on PETROLEUM ENGINEER INTERNATIONAL'S Annual Deep Well Survey

Average well depth


Average cost per well


Average bits per well


Average mud cost per well


Number of wells 15,000 ft & below

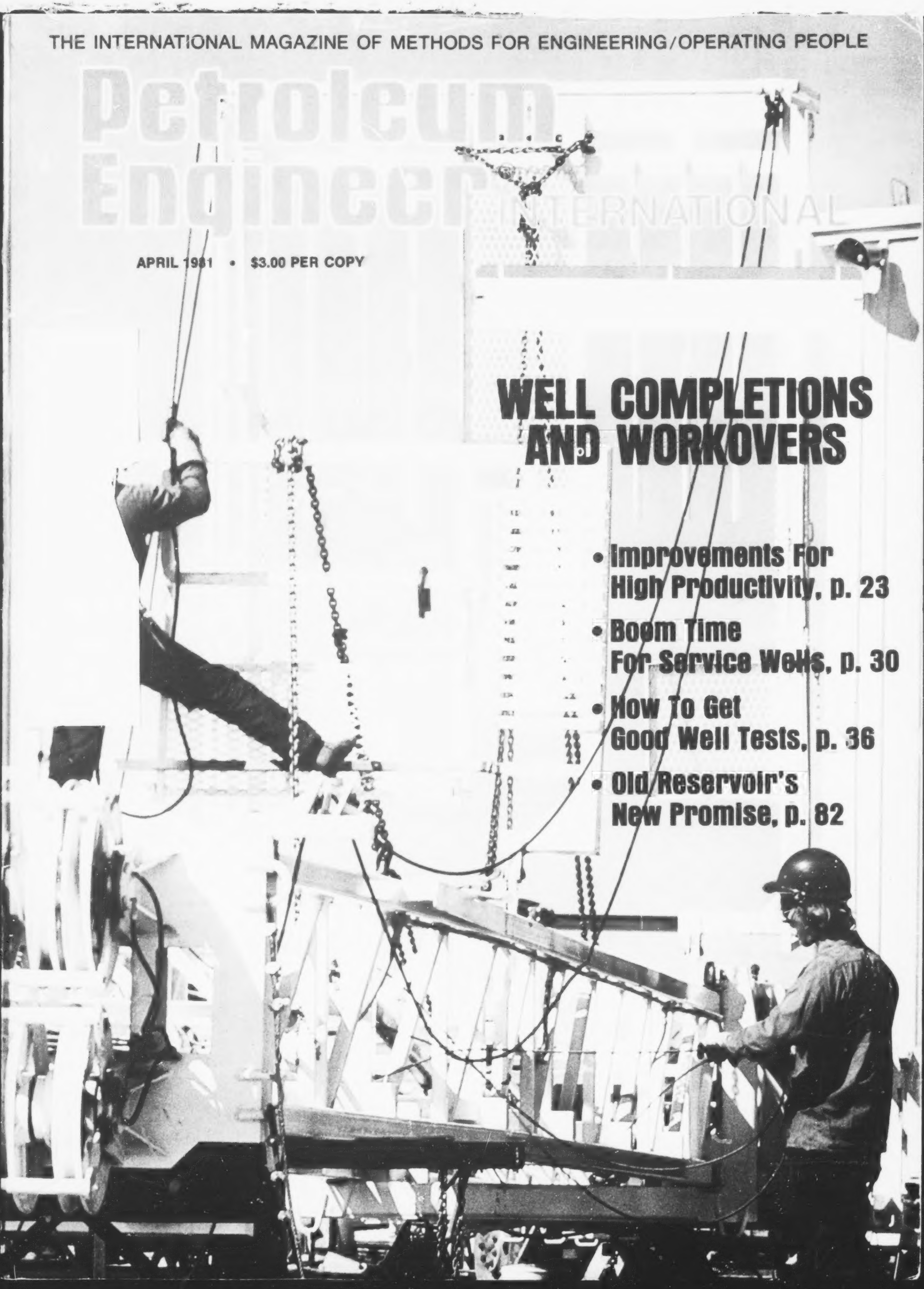
DEEP WELL OPERATORS

Adobe Oil & Gas Corp.
Aikman Petroleum Inc.
Alliance Exploration Corp.
Amarex Inc.
Amax Petroleum Corp.
Amerada Hess Corp.
American Natural Gas Production Co.
American Public Energy Co.
American Quasar Petroleum Co.
American Trading and Production Corp.
Amoco Production Co.
Anadarko Production Co.
Andover Oil Co.
A.N.R. Production Co.
The Anschutz Corp.
An-Son Corp.
Apache Corp.
Arkla Exploration Co.
ARCO Oil and Gas Co., a Division of Atlantic Richfield Co.
Belco Petroleum Corp.
Bledsoe Energy Corp.
Borden Inc.
Border Exploration Co.
Bradco Oil & Gas Co.
BTA Oil Producers
Bunker Exploration Co.
Campbell Energy Corp.
C & K Petroleum Inc.
Cashco Energy Corp.
Champlin Petroleum Co.
Chevron USA Inc.
CIG Exploration Co.
Cities Service Co.
CNG Producing Co.
CNR Resources Inc.
Dalton H. Cobb
Cockrell Corp.
Conoco Inc.
Cotton Petroleum Co.
V. Monta Currie Jr.
Daleco Resources
Damson Oil Corp.
Davis Oil Co.
The Dow Chemical Corp.
Dyco Petroleum Corp.
Eaton Operating Co.
Eberly & Meade
Eldorado Gas Co.
Elf Aquitaine Oil and Gas
El Paso Exploration Co.
Energy Development Corp.
Ennex Inc.
Enserch Exploration Inc.
Entex Petroleum Inc.
ETS Enterprises
Exchange Oil & Gas Corp.
Exxon Co. U.S.A.
First Energy Corp.
Florida Exploration Co.
Flynn Energy Corp.
Forest Oil Corp.
Forman Exploration Co.
L. R. French Jr.
Gadsco Inc.
General American Oil Co.
Getty Oil Co.
GHK Corp.
Gifford, Mitchell & Wisenbaker
Goldking Production Co.
Grace Petroleum Co.
Green Exploration
Gulf Oil Corp.
Riley Hagan
Hamilton Brothers Oil Co.
Harkins & Co.
Harper Oih Co.
Helmerich & Payne Inc.
Highland Resources Inc.
A. G. Hill
Hilliard Oil & Gas Inc.
HNG Oil Co.
Houston Oil & Minerals Corp.
Hughes and Hughes Oil and Gas
Hunt Energy Corp.
Hunt Petroleum Corp.
Husky Oil Co.
IMC Exploration Co.
Inexco Oil Co.
Jones-O'Brien Inc.
Kaiser-Francis Oil Co.
Kernridge Oil Co.
Kerr-McGee Corp.
Kilroy Co. of Texas Inc.
Koch Exploration Co.
Ladd Petroleum Corp.
Lear Petroleum Corp.
LGS Exploration Inc.
The Louisiana Land & Exploration Co.
McCormick Oil & Gas Corp.
McMoRan Exploration Co.
McMoRan Offshore Exploration Co.
McRae Exploration Inc.
Mack Oil Co.
Maddox Energy
Mallard Exploration Inc.
Marathon Oil Co.
Marion Corp.
Marline Oil Corp.
M. H. Marr
Tom F. Marsh Inc.
Martin Exploration Co.
Maynard Oil Co.
Mesa Petroleum Co.
D. A. Metts
Mid-American Oil Co.
Midroc Oil Co.
Mitchell Energy Corp.
Mobil Oil Corp.
W. A. Moncrief
Monsanto Co.
Moran Exploration Inc.
Moore McCormack
Mosbacher Production Co.
MRT Exploration Co.
Louis Mullen
Murphy Oil Corp.
Napeco Inc.
Natomas North America Inc.
Nicklos Oil & Gas Co.
Northern Natural Gas Co.
Nova Energy Corp.
Ocean Production Co.
Odessa Natural Corp.
Fred Olsen Inc.
Oxy Petroleum Inc.
Patrick Petroleum Co.
PCX Corp.
Pel-Tex Oil Co. Inc.
C. B. Pennington
Pennzoil Co.
The Petroleum Corp. of Delaware
Phillips Petroleum Co.
Pioneer Production Corp.
Placid Oil Co.
Pogo Producing Co.
Pruet Production Co.
Pursue Energy Corp.
Quintana Petroleum Corp.
Rainbow Resources
Reading & Bates Petroleum Co.
Reserve Oil Co.
Rosewood Corp.
Samedan Oil Corp.
Sanguine Ltd.
Santa Fe Energy Co.
Search Drilling Co.
Shell Oil Co.
Signal Petroleum
Donald C. Slawson
Sohio Petroleum Co.
Sonat Exploration Co.
Southland Royalty Co.
South Louisiana Production Co.
Southport Exploration Inc.
The Stone Oil Corp.
Strata Energy Inc.
Sun Co.
Sunrise Exploration
The Superior Oil Co.
System Fuels Inc.
John A. Taylor
R. C. Taylor
Tenneco Oil Exploration & Production Co.
Terra Resources Inc.
Texaco Inc.
Texas Crude Inc.
Texas Gas Exploration Corp.
Texasgulf Inc.
Texas Oil & Gas Corp.
Texas Pacific Oil Co.
Tiger Oil Co.
Tipperary Corp.
Tomlinson Interests Inc.
Transco Exploration Co.
Traver Oil Co.
Trigg Drilling Co.
Tri-Service Drilling Co.
Union Oil Co. of California
Union Texas Petroleum Corp.
Universal Resources
Walnoco Oil & Gas Co.
Wagner & Brown
Weaver Oil and Gas Corp.
Clayton W. Williams Jr.
Williams Exploration Co.
L. G. Williams Oil Co.
Woods Petroleum Corp.
Yates Petroleum Co.

THE INTERNATIONAL MAGAZINE OF METHODS FOR ENGINEERING/OPERATING PEOPLE

Petroleum Engineer INTERNATIONAL

APRIL 1981 • $3.00 PER COPY



WELL COMPLETIONS AND WORKOVERS

- Improvements For High Productivity, p. 23
- Boom Time For Service Wells, p. 30
- How To Get Good Well Tests, p. 36
- Old Reservoir's New Promise, p. 82

Canadian Activity Still At Record Levels

Say what you will about Canada's new energy proposals and the discouraging influence they are having on Prairie Province oil and gas activity, but Canadian drillers came in like a lion last month to tie the country's all-time rig count high of 464 active rigs set last August 11.

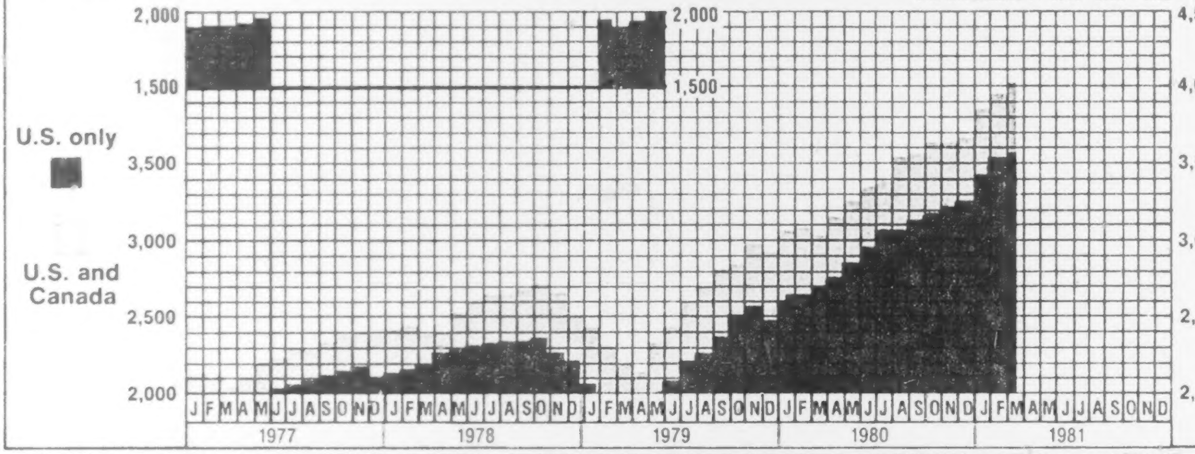
Much of this activity, of course, can be traced to contracts signed before Ottawa unleashed its budget proposals last October, but the fact remains that Canadian drillers are averaging almost 20 more active rigs this year than they did during 1980's record pace of 403 rigs active each week.

The true test, of course, will come during the spring thaw, which is almost upon us. It will be interesting to see if Canadian drillers return to work after the ground hardens, or if they will have folded their masts and silently slipped away.

Rotary Rigs Actually Making Hole In United States & Canada

As Reported to International Association of Drilling Contractors by Hughes Tool Company

	Feb. 16, 1981	Feb. 23, 1981	March 2, 1981	March 9, 1981
Alabama	15	14	12	11
Alaska				
Land	24	24	26	27
Offshore	1	1	1	1
Arkansas	28	26	28	31
Arizona	1	1	1	1
California				
Land	122	121	122	119
Offshore	19	19	19	19
Total	141	140	141	138
Colorado	69	66	66	65
Florida	8	8	8	9
Hawaii	1	1	1	1
Idaho	3	4	4	4
Illinois	30	30	30	30
Kansas	178	181	181	185
Kentucky	4	4	3	3
North Louisiana	53	54	55	50
South Louisiana				
Inland Waters	75	77	77	79
Land	173	161	155	159
Offshore	133	140	141	148
Total	434	432	428	436
Maryland	1	1	1	1
Michigan	27	32	34	34
Mississippi	69	69	69	72
Montana	81	78	75	79
Nebraska	10	11	11	10
Nevada	6	5	5	5
New Mexico	127	121	122	136
New York	6	6	8	7
North Dakota	102	99	104	110
Ohio	96	99	91	71
Oklahoma	569	581	584	596
Pennsylvania	34	36	35	35
Rhode Island				
Land	1	1	1	0
Offshore	2	2	2	2
South Dakota	3	3	5	3
Tennessee	0	3	2	2
Texas				
Offshore	73	70	67	78
Dist. 1	61	59	64	57
Dist. 2	42	51	49	51
Dist. 3	223	222	231	230
Dist. 4	124	116	115	112
Dist. 5 & 6	142	140	142	143
Dist. 7B	79	80	73	72
Dist. 7C	82	82	85	82
Dist. 8	153	158	163	145
Dist. 8A	72	73	74	81
Dist. 9	80	83	89	89
Dist. 10	47	46	50	51
Total	1178	1180	1202	1191
Utah	70	67	68	69
Virginia	1	1	1	1
Washington	1	1	1	1
West Virginia	34	34	33	27
Wyoming	173	174	185	172
Total U.S.	3529	3534	3568	3566
Western Canada	433	420	461	449
Eastern Canada	4	4	3	3
U.S. and Canada	3966	3958	4032	4018



PETROLEUM ENGINEER INTERNATIONAL • 800 Davis Building • Dallas, Texas 75202 • **TWX** 910-861-9306

Abbott Sparks	President
John G. Grant	Publisher and Vice President
W. B. Bleakley	Editor
Richard D. McNally	Associate Editor
Steven D. Moore	Technical Editor
Mary Jane Ellis	Assistant Editor
Laura Jacobus	Assistant Editor
Edna Taylor	Editorial Assistant
J. E. (Hank) Kastrop	Consulting Editor
Renn Rothrock, Jr.	Consulting Editor
Ernestine Adams	Editor, Energy Management Rpt.
Gregory Martin	Editor, Energy News/Energy Week
Sharon Hutcheson	Editorial Assistant

•

Brenda Hyde	Promotion
Alan Hilton	Service R&D Manager
Denise Tevis	Service R&D Department
Olga Dunn	Reader Service

ADVERTISING SALES OFFICES

EASTERN: Richard Martin, P.O. Box 89, Tennent, New Jersey 07763. (201) 446-3230

CHICAGO 60646: Bill Facinelli, Dwain Holmgren 4761 West Touhy Ave., Lincolnwood, Illinois (312) 679-1100

OHIO, WESTERN PA.: Dwain Holmgren, 4761 West Touhy Avenue, Lincolnwood, Illinois (312) 679-1100

LOS ANGELES 91106: Bruce Berkey, 61 S. Lake Ave., Box 4566, Pasadena, Calif., (213) 681-0685

HOUSTON 77027: Jess Adkins, Vice Pres., Gulf Coast Regional Manager, **Barry Biklen, Hal Odum,** 4151 Southwest Freeway, Suite 115 (713) 626-7850

DALLAS 75202: Ed Sealey, 800 Davis Bldg., (214) 748-4403, TWX 910-861-9306

WEST TEXAS: Rusty Meador, P.O. Box 611, Eldorado, Texas 76936 (915) 853-2689

UNITED KINGDOM, NETHERLANDS, SCANDINAVIA: Bryan Clark, Energy Publications Div. HBJ, 24/28 Oval Road, London NW1 7DX, England, (01) 485-7074 (OR 7075). Cable: HARBREX London NW1. Telex: 25775

FRANCE, ITALY, BELGIUM, SWITZERLAND: Gerard Lasfargues, 32, rue Desbordes Valmore, 75016-Paris, France. Telephone: 504 97 94

JAPAN: Mashy Yoshikawa, Orient Echo, Inc., 11th Floor Sankyo Bldg., 7-12 Tsukiji 2-chome, Chuo-ku, Tokyo. Telephone: 541-4923. Cable: MYORIENTECHO

GERMANY, AUSTRIA: S.I.P.A.S., **Wim. J. M. Sanders, Paul J. Verbunt,** Raadhuisstraat 24, P.O. Box 25, 1484 EN Graft-de Ryp, Holland. Telephone 02997-1303 and 3660. Telex: 13039 sipas nl, Telegrams: SIPAS-Amsterdam

Jane Dietz	Production Department Manager
Don Fickert	Graphics Director
Janell Fowler	Production Manager
Debbie Cooper	Production Coordinator
Dennis Howard	Presentation
Laura Page	Presentation
James Duke	Presentation
Victoria Valentin	Presentation

•

Gary Hogan	Business Manager
Jack Schabel	Circulation Director
Royal Courtney	Circulation Fulfillment Manager

ENERGY PUBLICATIONS
• a Division of Harcourt Brace Jovanovich •
P.O. BOX 1589 • 800 DAVIS BUILDING
DALLAS, TEXAS 75221 • (214) 748-4403

PETROLEUM ENGINEER INTERNATIONAL
Pipeline & Gas Journal
Energy Management Report
Energy News • Energy Week

HBJ A HARCOURT BRACE JOVANOVICH PUBLICATION
ABP
ABC

HARCOURT BRACE JOVANOVICH PUBLICATIONS
ROBERT L. EDGELL, Chairman; RICHARD MOELLER, President; LARS FLADMARK, Executive Vice President; ARLAND HIRMAN, Treasurer; JOE BILDERBACH, Vice President; JAMES GHERNA, Vice President; GEORGE GLENN, Vice President; THOMAS GRENEY, Vice President; EZRA PINCUS, Vice President; HARRY RAMALEY, Vice President; ABBOTT SPARKS, Vice President. OFFICES: 757 Third Avenue, New York, N.Y. 10017. Phone (212) 888-4444; 1 East First Street, Duluth, Minnesota 55802. Phone (218) 727-8511. 111 East Wacker Drive, Suite 1730, Chicago, Ill. 60601. Phone (312) 938-2300.

EDITORIAL ADVISORY COMMITTEE
Lloyd E. Elkins, Petroleum Consultant
Bennie L. Franks, President, Sun Texas Co.
Dennis E. O'Brien, Technology Section Head, Exxon Chemical Company
B. R. Jones, President, Eagle Production and Drilling Co.
Frank Schuh, Director of Engineering Development, ARCO Oil and Gas Co., a Division of Atlantic Richfield Co.
Marius J. Mes, Senior Research Scientist, Production Research Department, Conoco Inc.

PETROLEUM ENGINEER INTERNATIONAL (USPS 429-380) published 15 times each year, monthly plus March 15, July 15 and November 15, by Energy Publications Division, Harcourt Brace Jovanovich, P.O. Box 1589, Dallas, Texas 75221.

April, 1981, Volume 53, No. 5.

Copyright © 1981 by Harcourt Brace Jovanovich, Inc. All rights reserved. No part of this publication may be transmitted or reproduced in any form or by any means, electronic or mechanical, including photocopy, recording, or any information storage and retrieval system, without permission in writing from the publisher.

Subscription rate to personnel employed by companies involved with exploration, drilling, production, or field processing of oil or gas: one year $12.00, two years $18.00, three years $24.00 for North, Central, and South America. Outside North, Central, and South America: one year $25.00, two years $35.00, three years $45.00. Subscription rate for all others: $25.00 for one year. Single copy price $3.00. Entered as second class mail matter January 15, 1949, at the post office in Dallas, Texas, under the act of March 3, 1879. Microfilm copies are available through University Microfilms, Inc., 313 North First Street, Ann Arbor, Michigan. Indexed by Applied Science, Technology Index and the Engineering Index, Inc.

Postmaster: Send address changes to PETROLEUM ENGINEER INTERNATIONAL, P.O. Box 1589, Dallas, Texas 75221, USA.

Petroleum Engineer® INTERNATIONAL

The international magazine of methods for engineering/operating people
APRIL 1981 NUMBER 5 VOLUME 53

WELL COMPLETIONS AND WORKOVERS

Improved Completion Practices Yield High Productivity Wells 23
by Don A. Olivier, Shell Oil Co.

Get Ready For The Service Well Boom 30
by W. B. Bleakley, Editor

Use Sound Field Procedures To Get Good Well Tests 36
by Earl Smith, Otis Engineering Corp.

Sun To Breathe New Life Into Old Reservoir 48
by W. B. Bleakley, Editor

Well Completions and Workovers—Part 13 58
by L. Douglas Patton, Sargent Industries Inc., and W. A. Abbott, Great Eastern Energy and Development Corp.

ATCO Rig 59 Loaded With Advanced Technology 74
Staff Report

BP Rejuvenates West Sole Field 82
by J. R. Seed, BP Petroleum Development Ltd.

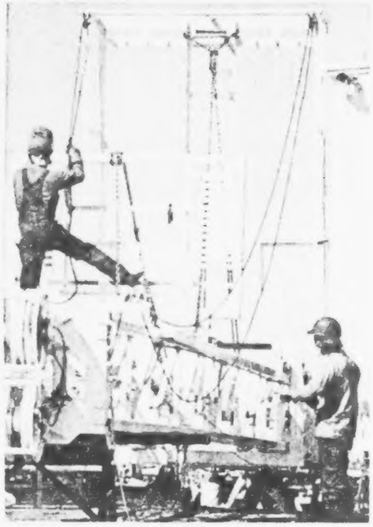
How To Check Reserve Estimates In Tight, Transmissible Gas Reservoirs—Part 1 97
by Mihir K. Sinha, Rocky Mountain Petroleum Consultants

Part 2—How To Air Drill—From Compressor To Blooey Line 120
by K.L. Mason, Amoco Production Co., and S. T. Woolley, Delta Drilling Co.

Charts Help Avoid Vibration Problems 142
Staff Report

EDITORIAL DEPARTMENTS

News Hi-lites 1
Significant Happenings in Petroleum
Course of Oil 6
The Place To Be
Technology Trends 8
Forecasts from Current Events
Offshore Technology 10
Maintenance Considerations
Continuous Tables 117
PE Quiz 138
by John R. Counsil
Company News 146
Drilling/Exploration 152
Leasing on Alaskan Reserve
Industry Meeting Calendar 172
Petroleum Profiles 174
Five minutes with Joshua Tharp
Professional Directory 184
Index to Advertisers EM 16



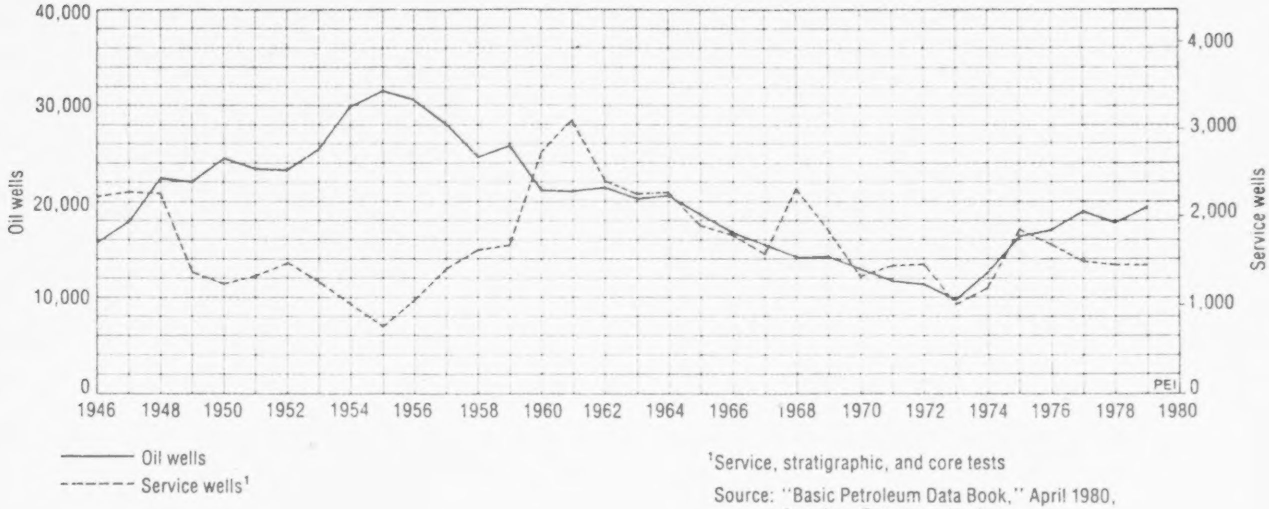
ABOUT THE COVER: The well servicing industry is a major participant in today's high rate of oilfield activity, and rig fleets are being expanded to keep up with the pace. Cover photo shows part of a new rig being put together by Pool Well Servicing Co., which is expanding its fleet by more than a third this year.

NEXT MONTH: The annual Offshore Technology issue in May is timed to coincide with the big Offshore Technology Conference being held in Houston May 4 to 7.

ENERGY management report™

by Ernestine Adams

Comment EM 1
Fourth Quarter Report EM 2
Energy World Report EM 4
Financial Notebook EM 6
Oil & Gas Professional Opportunities EM 7
New Products EM 15



[1]Service, stratigraphic, and core tests

Source: "Basic Petroleum Data Book," April 1980, American Petroleum Institute

Fig. 1. Oil and service well completions.

Get Ready For The Service Well Boom

by W.B. Bleakley, *Editor*

The surging number of active drilling rigs forecasts a record number of producing well completions for 1980. The final total, when the numbers come in, will be impressive. The same is predicted for 1981.

What these numbers do not reflect is the even more impressive demand that results for service wells. These wells are the ones needed to inject liquids and gases in enhanced recovery schemes and to provide source water. By extrapolating historical data, it has been determined that a latent demand developed between 1976 and 1980 for these wells. If historical trends hold, this demand represents 4,000 new service wells and 12,000 conversions from producing to service status.

This means that many rigs now drilling development wells or exploratory holes will be reassigned to drilling service wells, or the slack will be taken up by some of the new rigs under construction.

It will also mean a surge in the demand for the well servicing industry, as pumps are pulled, perforations are cleaned, and new downhole equipment is installed in the 12,000 converted wells.

Several Forces

The rationale behind these predictions is based on the several forces at work which combine to indicate a surge in service well completions.

One of these forces is past performance. Table 1 shows the number of oil wells and the number of service wells drilled in the years between 1962 and 1976. It also shows the total number of wells and service wells as a percentage of the total. This per-

TABLE 1. Oil and service wells compared

	Wells drilled			
Year	Oil	Service	Total	Service wells, % of total
1962	21,249	2,400	23,649	10.15
1963	20,288	2,267	22,555	10.05
1964	20,620	2,273	22,893	9.93
1965	18,761	1,922	20,683	9.29
1966	16,780	1,810	18,590	9.74
1967	15,329	1,584	16,913	9.37
1968	14,331	2,315	16,646	13.90
1969	14,368	1,866	16,234	11.49
1970	13,020	1,347	14,367	9.38
1971	11,858	1,449	13,307	10.89
1972	11,306	1,464	12,770	11.46
1973	9,902	1,010	10,912	9.26
1974	12,784	1,195	13,979	8.55
1975	16,408	1,862	18,270	10.19
1976	17,059	1,690	18,749	9.01
			Average	10.18

TABLE 2. Service well shortfall

	Wells drilled			Service wells		
Year	Oil	Service	Total	% of total	Needed to meet 10.18% avg	Shortfall
1977	18,912	1,497	20,409	7.33	2,143	646
1978	17,775	1,456	19,231	7.57	2,014	558
1979	19,383	1,447	20,830	6.95	2,196	749
1980*	29,000	1,300	30,300	4.29	3,286	1,986
			New service well demand:			3,939
			Conversions needed (at 3.2):			12,605
					Total	16,544

*Estimated

centage remains relatively constant and averages 10.18% for the 15-year period.

Table 2 shows the equivalent data for the 4-year period starting in 1977, with 1980 data estimated. Note that the number of service wells, as a percentage of total wells, is far below the 10.18% average for the preceding 15 years. The last columns of this table show the number of service wells that should have been drilled to reach the 1962 to 1976 average and, by difference, the number needed to be drilled to attain that historical goal — just under 4,000 wells.

Historical data also show that 3.2 producing wells are converted to service status for each new service well drilled. If the shortfall in new service wells is 3,939, as shown in Table 2, the number of expected conversions is 3.2 times that number, or 12,605. On a historical basis, we need 16,544 service wells just to handle the oil completions made from 1977 to 1980.

Fig. 1 shows some of the same data, but goes back further than 1962. During the drilling boom of 1955, there were few service wells drilled, but that boom brought in a large number of new oilfields which were put on production in a conventional manner, accepted as standard procedure for the times. Since many areas were under proration, there was no need to inject water or to use an enhanced recovery scheme as a means of maintaining reservoir pressure or improving the recovery factor.

The boom in service wells that began in 1956 and ended in 1961 was a natural consequence of these discoveries, once operators noted that production from reservoirs discovered in 1955 was declining and that some sort of fluid injection was needed to prevent reservoir degradation. The result was a flurry of activity to drill more service wells or recomplete marginal producing wells to injection status.

The modest jump in service well completions in 1968 (see Fig. 1) is probably due to start-up of additional enhanced recovery projects, including conventional waterflooding, mostly on a local basis. In Texas alone, 1,569 service completions were made during the 2-year period of 1968 to 1969.

The 1973 oil embargo is probably responsible for the spurt of activity in both producing and service wells as operators sought new reserves and tried to make the most out of known reservoirs. Service well completions started a decline in 1975, and that decline continues.

Why

The decline in the number of service well completions which started in 1975 is probably due to the price of oil at that time. It was more profitable to find new oil than it was to exploit known reserves by fluid-injection means.

Under price control, the incremental production increase from waterflooding a reasonably good oilfield did not justify the cost of service wells and surface equipment.

As late as December 1979, for example, more than 55% of U.S. production was being sold for about $11/bbl, little more than one-fourth the price of new oil.

And price decontrol didn't help much either. If a reservoir was declining, there was more incentive for the operator to let it decline to the stripper stage rather than spend money on rejuvenation. Once at the stripper level, a field had to be maintained that way for at least 1 year to qualify for the "once-a-stripper, always-a-stripper" category. After that year, operators will gladly spend whatever it takes to boost production — drill new producing and service wells, convert old producers to injection wells, install surface equipment, etc.

Price decontrol has put all of this in a new light.

What's Coming

Under decontrolled crude prices, operators are expected to take a new look at various production schemes. Many good ideas, shelved in the past because of economics, will be reborn to lead the way to high yields from known reservoirs.

Some years ago, operators agreed that certain enhanced oil recovery techniques recovered more oil from a reservoir than could be obtained by straight depletion methods or routine waterflooding. But the price of crude always seemed to be $5/bbl less than what was needed to make these methods economically attractive. Then the price of oil went up by about $5/bbl, but so did the price of the chemicals and support equipment needed to operate a tertiary-type flood.

Thanks to some quantum jumps in world oil prices, in the next year or so we may see crude oil value outdistancing that of micellar polymers and other enhanced recovery chemicals on a relative basis, throwing a new light on reservoir evaluation.

A new emphasis on enhanced recovery — or even conventional waterflooding — requires the addition of many new service wells, far in excess of the 16,000 plus shortfall we now have. Projection of 1980 trends into 1981 and beyond indicates this shortfall is growing at an alarming rate. Add to that the number of service wells needed to install recovery projects not now under consideration and the result is even more alarming.

What It Means

The impact of the shortfall in numbers of service wells could have far-reaching effects. And we may not have to wait long to see them, as the curve has already turned upward. During the third quarter of 1980, service well completions were running 84% ahead of the same period in 1979.

The first impact is on the number of drilling rigs needed to add 4,000 new wells to our total. Using average data, this should require about 200 rigs working a full year.

The 12,000 well conversions from producing status to service status will occupy the full time of 100 workover rigs for a full year. This is probably conservative, as it only allows 3 days for each conversion and assumes operations 7 days/week year-round. And now allowances have been made for parted tubing, stuck packers, poor squeeze jobs, and other misfortunes.

These conversions, plus the 4,000 new service wells, will add some 16,000 wells to the total inventory (not allowing for abandonments in other areas). These wells will probably need some sort of remedial work at least once each year, increasing the load on the well-servicing industry and the demand for more workover rigs.

Secondary impacts will be felt by service and supply companies, as each of these new wells will require casing, tubing, downhole equipment, and a wellhead. Further, each will require corrosion protection and the application of various chemicals to carry out the objectives of an enhanced recovery project.

A natural consequence of any large-scale injection program is the increased volume of fluid to be handled from producing wells—more oil, more water, or both. This introduces a demand for more artificial lift, either new installations or replacement of present equipment to increase capacity.

The service-well shortfall, coupled with the continuing increase in the number of development and exploratory wells being drilled, means there is plenty of work for the many new drilling contractors entering the business, for the 50 or so new drilling rigs being fabricated each month, and for the large number of rigs entering the U.S. to escape the unrest in Canada. ■

Acknowledgement. This information was developed in conjunction with Craig W. Pech, director of market planning for Baker Oil Tools Co., with most of the data coming from Baker's "Five Year Activity Forecast". Other data obtained from IADC publications.

McKissick . . . The Complete Line of Oil Field Blocks

Contractors throughout the world have come to know and depend on McKissick Oil Field Blocks . . . and for the best of reasons. Reasons like dependability, long service life and trouble free operation.

We have the exact type of block that you need for almost any application. And, when you choose McKissick, excellent parts back-up is always part of the bargain.

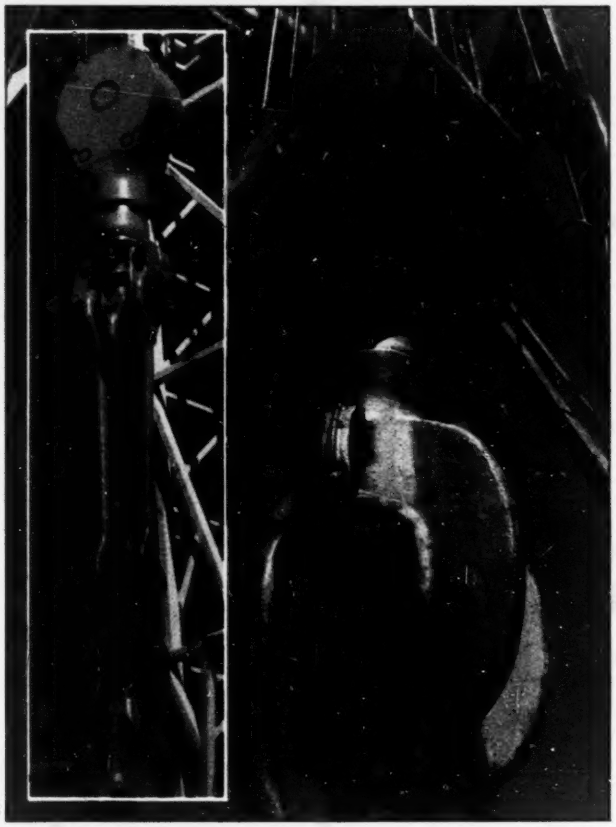
McKissick — One of the Crosby Group

Please send for your Free Crosby Catalog.

the Crosby® group

A DIVISION OF amhoist
P.O. Box 3128, Tulsa, Oklahoma 74101 (918) 834-4611

COMPANY NAME ____________
ADDRESS ____________
CITY ________ STATE ________
ZIP ________ PHONE ________ PEI-143-C



Circle 218 on Reader Service Card

Gas Confirmation Offshore Trinidad

Successful testing of the Dolphin No. 2 well in the east coast marine area off Trinidad and Tobago indicates there is a substantial amount of gas reserves in the area. The well is located approximately 50 miles east of Galeota Point in 380 ft of water. It is 3,800 ft west of the Dolphin No. 1 gas discovery drilled by Texaco Trinidad Inc. in 1977 as operator for itself and Tenneco Oil Co. of Trinidad.

The Dolphin No. 2 tested gas from four successful test intervals below 5,600 ft at individual rates between 6.4 and 20 MMcfd on ¾-in. chokes with surface pressures of 650 to 1,900 psi. Combined flow rate for the four tests was 54.8 MMcfd.

Triton To Drill Off New Zealand

New Zealand Petroleum Co. Ltd., an affiliate of Triton Oil & Gas Corp., Dallas, Tex., has been issued a 5-year license covering 1.5 million acres off the coast of New Zealand's South Island, near Greymouth.

An initial exploratory well is to be drilled in mid-1981. It is programmed for TD of 7,000 ft and is expected to penetrate an Eocene structure that is geologically equivalent to the producing zones of the Maui and Kapuni fields.

International Count At Record 5,000 Rigs

The Free World rig count topped 5,000 at the end of last year for the first time ever, according to the report for December 31 issued by Hughes Tool Co., Houston, Tex.

The count for all countries except the U.S. and Canada increased by 135 rigs during 1980 to reach 1,351 at year-end. Canada gained 13 active rigs during the year, and the U.S. added a whopping 820.

Latin America gained 22 rigs during the last quarter of 1980, with 11 of them credited to Colombia, and six to Argentina. Mexico stayed at 216 rigs during the quarter to maintain its position as the Free World's third busiest drilling country — after the U.S. and Canada.

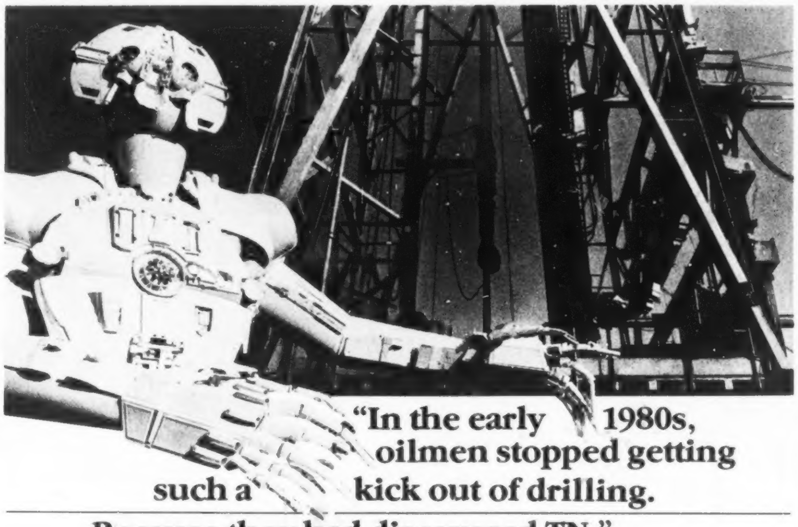
Europe picked up a total of 11 rigs between September and December, with France upping its total by seven, and Italy picking up nine.

Africa, paced by a drop of five rigs in Algeria, finished the year with a loss of one rig for the quarter.

The Middle East maintained the status quo all the way down the line in the fourth quarter, and Asia's gain of 10 rigs was paced by an eight-rig increase in Indonesia.

The Quarterly International Active Rig Report as prepared by Hughes Tool Co., Houston, Tex.

Country	Mar. '80	June '80	Sept. '80	Dec. '80
South America, Central America and Mexico				
Argentina	73	72	76	82
Bolivia	4	4	4	4
Chile	6	6	7	8
Ecuador	3	3	3	3
Peru	19	20	22	22
Brazil	64	76	73	75
Venezuela	52	54	50	50
Colombia	12	14	10	21
Trinidad	13	14	12	12
Mexico	213	216	216	216
Central America	2	3	4	6
	461	482	477	499



"In the early 1980s, oilmen stopped getting such a kick out of drilling.
Because they had discovered TN."

Those pioneers of drilling began what we now call the "new era of production" when TN introduced the now-standard, non-contacting SGM gauge that could measure the density of drilling muds with precision to ± 1% of desired weight, even while the mud was being pumped. It was a tremendous advance in reducing problems caused by kicks.

During the decade of the eighties, an historic search for increased productivity resulted in a number of innovations, not the least of which was the highly reliable SGM. We tend to take it for granted now; but, back then, TN had produced a new means of forecasting possible kicks, simply by detecting gas cutting quickly and continuously.

The SGM also was the first truly accurate method of continuously measuring density increases. It greatly reduced chances of lost circulation by warning drillers when muds might be getting too heavy. And it provided the continuous record of mud weight that we still use to spot changes, allowing peripherals for chart recorders, alarms and CRT displays.

People who operate onshore and offshore rigs long have appreciated the increased profitability gained by applying SGM precision to both suction and discharge lines, in order to measure either oil- or water-based muds. Humans seem to think in terms of money. However, I appreciate the increased oil production that keeps me in shape.

I think you would be well advised to contact TN for a special brochure on today's (and tomorrow's) oilfield technology. Write to P.O. Box 9267, Austin, Texas 78766; or call (512) 836-0801.

TN TEXAS NUCLEAR
A BAKER INTERNATIONAL COMPANY
As reliable as tomorrow.

Circle 300 on Reader Service Card

Country	Mar. '80	June '80	Sept. '80	Dec. '80
Europe				
Austria	9	8	7	7
Denmark	2	3	3	2
France	11	11	11	18
Germany	21	23	22	22
Greece	2	3	3	3
Holland	18	20	17	14
Italy	19	16	16	25
Norway	11	11	11	11
Spain	6	12	11	12
Switzerland	1	1	1	1
United Kingdom (North Sea)	43	50	50	50
Yugoslavia	22	22	22	22
	166	181	176	187
Africa				
Algeria	113	113	111	106
Angola	5	5	5	4
Cameroon	7	4	4	8
Congo	4	4	4	5
Gabon	9	9	9	6
Libya	45	40	40	40
Morocco	2	2	2	3
Chad	1	1	1	1
Nigeria	20	20	20	20
Tunisia	7	7	7	9
Niger	5	5	5	5
Ivory Coast	3	3	3	3
South Africa	2	2	2	2
Sudan	2	2	2	2
Zaire	1	1	1	1
	226	218	216	215
Middle East				
Abu Dhabi	21	24	24	24
Bahrain	1	1	1	1
Dubai	1	3	3	3
Egypt	24	27	27	27
Iraq	37	39	39	39
Kuwait	2	3	3	3
Oman	7	8	8	8
Qatar	7	8	8	8
Ras Al Khaimah	–	1	1	1
Saudi Arabia	24	25	25	25
Sharjah	–	1	1	1
Syria	16	15	15	15
Turkey	7	7	40	40
	147	162	195	195
Asia				
Bangladesh	2	2	4	5
Brunei	8	8	7	7
Burma	23	24	27	28
India	43	42	43	43
Indonesia	72	77	76	84
Japan	15	16	16	15
Malaysia	11	11	13	13
Pakistan	14	12	14	15
Philippines	17	13	9	10
Thailand	5	4	5	5
Taiwan	12	12	12	12
	224	223	227	237
Australia	12	17	19	14
New Zealand	2	1	1	4
Papua New Guinea	–	1	1	–
	14	19	21	18
Total free world except U.S. and Canada	**1,238**	**1,285**	**1,312**	**1,351**
North America				
Canada	400	418	387	343
U.S.	2,659	2,901	3,138	3,326
Totals	**4,297**	**4,604**	**4,837**	**5,020**

Letters

TO THE EDITOR:

In your Offshore Technology section on page 16 of the February 1981 issue of PETROLEUM ENGINEER INTERNATIONAL magazine, you stated that "A deep stratigraphic test well is being drilled about 28 miles southwest of San Luis Obispo, California, in about 1,820 feet of water by Exploration Services Company of Ventura, California, as operator for a group of participating oil companies."

There is presently no stratigraphic test well drilling off the California coast. The test well mentioned in your article was proposed to be drilled in August 1980 by Exploration Services Company, however, the company was unable to obtain an available drill rig at that time. The proposed test was cancelled and no permit to drill was ever issued by the U.S. Geological Survey.

Robert L. Rioux
U.S. Department of the Interior
Reston, Va.

The writer is deputy division chief of offshore minerals regulation for the U.S. Geological Survey's Conservation Division.

MEETING CALENDAR

5-7 Deep Drilling and Production Symposium, Amarillo Petroleum Section of the Society of Petroleum Engineers, Amarillo Civic Center, Amarillo, Tex.

5-8 Joint Symposium on Enhanced Oil Recovery, Society of Petroleum Engineers and the Department of Energy, Tulsa Assembly Center, Tulsa, Okla.

5-8 American Petroleum Institute Production Department 11th annual meeting — North American Fossil Fuel Potential, Sheraton Palace Hotel, San Francisco, Calif.

6-9 International Energy Development Conference, Brigham Young University, Salt Palace Civic Auditorium, Salt Lake City, Utah.

6-10 Corrosion/81 — International Corrosion Forum, National Association of Corrosion Engineers, Sheraton Centre Hotel and the Hotel Toronto, Toronto, Ontario, Canada.

7-9 Machinery Vibration Monitoring and Analysis Meeting, Vibration Institute, The Royal Orleans, New Orleans, La.

10-12 Region IV Association of Desk and Derrick Clubs annual meeting, El Tropicano Hotel, San Antonio, Tex.

12-15 29th annual convention, Rocky Mountain Section of the American Association of Petroleum Geologists, Albuquerque Hilton Inn, Albuquerque, N.M.

13-14 Energy Project Financing — An International Analysis, *Business Week*, McGraw-Hill Headquarters, New York, N.Y.

13-15 1981 Engineers Public Affairs Forum, National Society of Professional Engineers, Hyatt Regency Hotel, Washington, D.C.

15 Microbial Enhancement of Oil Recovery, Bartlesville Energy Technology Center, U.S. Department of Energy, Bartlesville, Okla.

23-24 28th annual Southwestern Petroleum Short Course, The University Center of Texas Tech University, Lubbock, Tex.

26-May 28 3rd Advanced International Program in Oil and Gas Financial Management, Southwestern Legal Foundation and the Center for International Accounting Development of the University of Texas at Dallas, Southwestern Legal Foundation Building on the UTD Campus, Richardson, Tex.

26-29 Third annual Industrial Energy Conservation Technology Conference and Exhibition, Texas Industrial Commission, Hyatt-Regency Hotel, Houston, Tex.

30-May 1 Twelfth Annual Pittsburgh Conference on Modeling and Simulation, School of Engineering, University of Pittsburgh and others, Pittsburgh, Pa.

May

3-6 83rd Annual General Meeting of CIM and the 32nd Annual Technical Meeting of the Petroleum Society of CIM — Our Challenge — Managing Canada's Resources, Canadian Institute of Mining and Metallurgy, Calgary Four Seasons Hotel, Calgary, Alberta.

4-7 Thirteenth Annual Offshore Technology Conference, Houston Astrodomain, Houston, Tex. ■

4th Quarter Report

Profit Margin Dips Despite Record Revenues

Rising prices for crude oil, refined products and natural gas were the biggest factor in an overall 26.6% increase in 1980 earnings over 1979 results for 70 oil companies.

Slack demand for refined products and high inventories in second half of 1980 hurt refining and marketing operations. Product prices in virtually all U.S. markets failed to keep pace with rising crude oil costs. As a result, the companies' net income in fourth quarter rose only 1% over same quarter of 1979.

Though many firms reported record revenues and earnings, the group's overall profit margin for 1980 was 5.6%, down from 5.8% in 1979.

Oil/gas production was the main profit maker for integrated oil firms and for some gas utilities. "Windfall profits" tax, applied to almost all U.S. oil production after March 1, penalized independents with a high ratio of domestic oil output.

Texaco's 12-month earnings rose but fourth quarter net dropped from same 1979 period. Downstream operations declined in U.S. due to lower margins, but rose internationally.

Exxon said higher prices led to greater net on production, although gas sales fell 7%. Higher refined product margin for 12-month period more than offset a 10% decline in sales volume.

Standard California had higher domestic gas production. Despite fourth quarter slump, refining and marketing earnings for full year were higher than in 1979. Higher prices offset lower margins on product sales internationally.

Mobil received higher prices on lower volumes of product sales. Worldwide chemical sales rose. Foreign inventory profits were $344 million higher than in 1979.

Energy production earnings rose about 33% for Gulf in 1980, though fourth quarter net fell as refining/marketing and chemicals slumped.

Conoco's international oil/gas earnings benefited from higher crude oil margins and production in North Sea, but margins and volumes fell in Libya, and U.S. income taxes were higher.

Higher oil prices, greater output from North Slope of Alaska and strong refining operations in first half caused Atlantic Richfield's income gain.

Union Oil had higher margins in domestic refining/marketing and higher chemical earnings as well as more oil/gas production income.

Greater liquids production overseas and higher prices were responsible for Standard Indiana's income gain, partially offset by lower refined product margins, lower chemical earnings, lower domestic oil/gas output.

Worldwide liquids output rose for Phillips Petroleum, but earnings from refining/marketing and chemicals fell below 1979 levels.

Net income in U.S. more than doubled for Marathon Oil, while earnings from foreign sources plummeted. Higher production revenues offset lower demand for products and higher exploration costs.

Tosco had net loss in fourth quarter and 12-month earnings fell from the previous year. Sharp increases in crude oil costs couldn't be passed through to customers because of high inventories of products.

Natomas had record earnings in all divisions: oil/gas production, marketing, geothermal and coal mining. Mapco cited higher prices from decontrol of gas liquids and record coal production.

Earnings for the group of large

FOURTH QUARTER GAS COMPANY FINANCIAL REPORTS

	Three months ending December 31**						Twelve months ending December 31**					
	Revenues ($000)			Earnings* ($000)			Revenues ($000)			Earnings* ($000)		
Company	1980	1979	% Chg.	1980	1979	% Chg.	1980	1979	% Chg.	1980	1979	% Chg.
Alabama Tennessee N.G.	27,067	19,838	+ 36.4	1,589	1,073	+ 48.1	91,907	69,878	+ 31.5	5,266	4,893	+ 7.6
American Natural Res.	969,920	797,528	+ 21.6	57,884	60,969	- 5.1	3,038,546	2,505,622	+ 21.3	113,219	148,654	- 23.8
Arkansas Louisiana Gas	240,223	196,546	+ 22.2	6,266	8,738	- 28.3	974,510	735,302	+ 32.5	73,334	60,741	+ 20.7
Columbia Gas	1,037,178	872,689	+ 18.8	56,234	42,450	+ 32.5	3,636,507	2,851,733	+ 27.5	165,311	143,113	+ 15.5
Commonwealth N.G.	61,352	47,566	+ 29.0	1,423	1,360	+ 4.6	211,232	154,318	+ 36.9	6,035	5,448	+ 10.8
Consolidated N.G.	751,748	640,760	+ 17.3	41,446	37,843	+ 9.5	2,503,054	2,045,947	+ 22.3	113,008	122,823	- 8.0
El Paso Companies	928,106	792,264	+ 17.1	30,534	31,971	- 4.5	3,543,436	2,663,809	+ 33.0	108,889	110,725	- 1.7
Enserch Corp.	694,734	597,799	+ 16.2	34,807	21,249	+ 63.8	2,694,933	2,238,216	+ 20.4	139,583	84,535	+ 65.1
Houston N.G.[1]	653,253	561,371	+ 16.4	54,052	43,394	+ 24.6	2,449,754	2,006,622	+ 22.1	206,848	151,100	+ 36.9
InterNorth	907,514	775,687	+ 17.0	42,559	55,757	- 23.7	3,037,764	2,499,202	+ 21.5	211,722	185,538	+ 14.1
Mountain Fuel Supply	113,398	98,259	+ 15.4	8,642	9,281	- 6.9	406,189	334,789	+ 21.3	30,851	25,540	+ 20.8
Northwest Energy	396,099	384,879	+ 2.9	16,049	14,697	+ 9.2	1,323,432	1,119,532	+ 18.2	51,347	41,267	+ 24.4
Oneok Inc.	329,143	245,344	+ 34.2	6,844	4,621	+ 48.1	943,853	735,879	+ 28.3	42,075	31,244	+ 34.7
Pacific Lighting	950,262	703,085	+ 35.2	38,017	17,072	+122.7	3,401,903	2,244,279	+ 51.6	101,129	92,071	+ 9.8
Panhandle Eastern	718,143	549,707	+ 30.6	40,588	23,357	+ 73.8	2,472,235	1,967,657	+ 25.6	181,959	146,184	+ 24.5
Peoples Energy[2]	828,947	752,690	+ 10.1	40,272	39,674	+ 1.5						
Pioneer Corp.	232,063	200,248	+ 15.9	23,962	17,016	+ 40.8	911,989	732,486	+ 24.5	90,556	65,631	+ 38.0
Southern Natural Res.	469,385	431,644	+ 8.7	35,155	25,917	+ 35.6	1,798,723	1,492,222	+ 20.5	139,257	109,415	+ 27.3
Texas Eastern Corp.	1,155,830	868,498	+ 33.1	58,812	46,131	+ 27.5	4,272,854	2,939,055	+ 45.4	219,757	177,104	+ 24.1
TransCanada PipeLines	946,025	797,963	+ 18.6	26,339	24,324	+ 8.3	3,143,382	2,580,972	+ 21.8	93,435	87,168	+ 7.2
Transco Companies	819,622	468,944	+ 74.8	31,729	22,384	+ 41.7	2,627,787	1,528,108	+ 72.0	112,506	68,361	+ 64.6
Union Gas Ltd.	247,056	195,962	+ 26.1	7,974	4,164	+ 91.5						
United Energy Res.	1,113,433	957,788	+ 16.3	48,334	28,380	+ 70.3	4,135,342	3,133,654	+ 32.0	165,454	111,687	+ 48.1
TOTAL	14,590,501	11,957,059	+ 22.0	709,511	581,822	+ 22.0	47,619,332	36,579,282	+ 30.2	2,371,541	1,973,242	+ 20.2

**Excluding non-recurring items. *Earnings available to common stock. [1]Ends October 31. [2]Ends September 30.

gas companies surveyed by EMR rose 20.2% over the previous year but trailed revenue gains.

Most gains in net income continue to come from non-regulated operations, especially oil/gas production, gas processing, NGL sales and contract drilling. Decontrol of gas liquids prices (except propane) on Jan. 1, 1980 boosted earnings. Even though new natural gas customers are being added in most parts of U.S., gas sales are essentially flat due to conservation by existing customers.

Income rose for Consolidated Natural Gas, spearheaded by oil/gas production, which offset the effects of recession, conservation and suspension of LNG operations at Cove Point, MD.

Oneok's healthy earnings gain was mainly due to non-utility operations—production, NGL extraction, contract drilling. Same factors boosted income of Pioneer Corp.

Non-utility business, including real estate and energy-related activities, accounted for most of the improvement in Pacific Lighting Corp.'s income.

Net income fell for Peoples Energy Corp.'s natural gas pipeline unit, but rose for the firm's contract drilling unit.

Record earnings for InterNorth were mainly due to its liquid fuels group, which benefited from higher prices.

United Energy Resources had higher gas sales, more oil/gas production and healthy drilling and well servicing operations.

El Paso said higher profits from oil/gas production were more than offset by lower chemical profits and loss from discontinued LNG operations. The company will write down the investment in its LNG tanker fleet.

FOURTH QUARTER OIL COMPANY FINANCIAL REPORTS

	Three months ending December 31**						Twelve months ending December 31**							
	Revenues ($000)			Earnings* ($000)			Revenues ($000)			Earnings* ($000)			Profit Margin#	
Company	1980	1979	% Chg.	1980	1979	% Chg.	1980	1979	% Chg.	1980	1979	% Chg.	1980	1979
§Adams Resources & Energy	68,807	54,443	+ 26.4	1,123	740	+ 51.8	241,163	178,893	+ 34.8	(3,037)	4,439			2.5
Altex Oil	374	213	+ 75.6	168	48	+250.0	1,074	734	+ 46.3	184	(227)		17.1	
American Petrofina	613,450	457,551	+ 34.1	19,315	17,707	+ 9.1	2,098,464	1,587,229	+ 32.2	104,279	83,187	+ 25.4	5.0	5.2
Argonaut Energy	1,047	717	+ 46.0	96	118	- 18.6	2,648	1,930	+ 37.2	167	(3)		6.3	
§Ashland Oil	1,969,400	1,928,500	+ 2.1	20,200	75,900	- 73.4	8,159,300	7,245,700	+ 12.6	149,500	551,400	- 72.9	1.8	7.6
Asamera	99,416	72,976	+ 36.2	3,516	2,178	+ 61.4	269,071	192,157	+ 37.9	7,923	9,280	- 14.6	2.9	4.8
§Atlantic Richfield	7,483,382	4,987,482	+ 50.0	398,279	342,958	+ 16.1	24,578,042	16,818,324	+ 46.1	1,651,423	1,165,894	+ 41.6	6.7	6.9
Belco Petroleum	222,325	202,446	+ 9.8	22,650	24,900	- 9.0	836,933	643,503	+ 30.1	77,893	79,036	- 1.4	9.3	12.3
Brock Exploration	1,978	1,631	+ 21.3	371	428	- 13.3	5,596	3,821	+ 46.5	1,259	896	+ 41.4	22.5	23.4
Callon Petroleum[2]	1,898	1,721	+ 10.9	202	364	- 44.5	8,488	4,628	+ 83.4	1,358	911	+ 49.1	16.0	19.7
Centura Energy	7,510	5,647	+ 33.0	285	184	+ 54.9	10,147[1]	7,731[1]	+ 31.3	151[1]	64[1]	+135.9	1.5	0.8
Clark Oil & Refining	400,742	332,017	+ 20.7	4,324	13,170	- 67.2	1,657,635	1,175,015	+ 41.1	43,920	41,658	+ 5.4	2.7	3.5
§Conoco Inc.	5,240,000	3,795,700	+ 38.1	240,600	190,700	+ 26.2	18,766,300	13,082,900	+ 43.4	1,026,200	815,400	+ 25.9	5.5	6.2
Crown Central Petroleum	313,748	327,211	- 4.1	3,868	19,445	- 80.1	1,266,898	1,054,771	+ 20.1	19,147	71,678	- 73.3	1.5	6.8
Crystal Oil	84,139	53,585	+ 57.0	310	4,152	- 92.5	273,164	164,898	+ 65.7	10,690	10,233	+ 4.5	3.9	6.2
Delhi International Oil	7,399	5,319	+ 39.1	960	878	+ 9.3	27,138	17,594	+ 54.2	4,784	3,590	+ 33.3	17.6	20.4
Diamond Shamrock	848,100	671,381	+ 26.3	45,917	58,507	- 21.5	3,145,720	2,356,858	+ 33.5	201,214	178,123	+ 13.0	6.4	7.6
Exeter Oil	1,434	1,125	+ 27.5	248	391	- 36.6	4,461	2,700	+ 65.1	1,129	800	+ 41.1	25.3	29.6
Exxon	29,847,000	25,820,000	+ 15.6	1,350,000	1,365,000	- 1.1	110,469,000	84,968,000	+ 30.0	5,660,000	4,295,000	+ 31.8	5.1	5.1
Felmont	15,218	10,251	+ 48.5	1,982	2,827	- 29.9	57,441	40,272	+ 42.6	13,697	9,351	+ 46.5	23.8	23.2
Galaxy Oil[2]	3,011	2,151	+ 39.9	61	62	- 1.6								
General American	75,765	57,117	+ 32.6	10,499	15,214	- 31.0	273,448	192,599	+ 42.0	54,131	46,685	+ 15.9	19.8	24.2
§Getty Oil	2,966,250	1,546,526	+ 91.8	210,857	182,330	+ 15.6	10,436,827	5,120,739	+103.8	870,847	603,363	+ 44.3	8.3	11.8
Gulf Energy & Develop.	18,685	10,922	+ 71.1	1,989	2,117	- 6.0	50,486	33,544	+ 51.0	6,728	5,552	+ 21.2	13.3	16.6
Gulf Oil Corp.	7,603,000	7,730,000	- 1.6	304,000	366,000	- 16.9	28,790,000	26,140,000	+ 10.1	1,407,000	1,322,000	+ 6.4	4.9	5.1
Helmerich & Payne	66,217	46,862	+ 41.3	15,398	10,452	+ 47.3								
Houston O&M	125,323	86,746	+ 44.5	33,186	23,666	+ 40.2	382,987	300,624	+ 27.4	79,550	65,651	+ 21.2	20.8	21.8
Inexco Oil	39,220	29,751	+ 31.8	5,190	5,372	- 3.4	146,606	103,249	+ 42.0	22,576	17,504	+ 29.0	15.4	17.0
Kerr-McGee Corp.	949,371	755,470	+ 25.7	51,791	40,396	+ 28.2	3,477,881	2,683,469	+ 29.6	182,223	160,017	+ 13.9	5.2	6.0
Lear Petroleum	27,109	22,858	+ 18.6	2,304	1,760	+ 31.0								
Louisiana L&E	305,100	246,352	+ 23.8	48,227	44,313	+ 8.8	1,075,771	817,014	+ 31.7	180,162	169,044	+ 6.6	16.7	20.7
Mapco Inc.	532,864	439,092	+ 21.4	28,969	30,765	- 5.8	1,769,740	1,261,443	+ 40.3	122,260	88,600	+ 38.0	6.9	7.0
§Marathon Oil	2,420,748	2,220,287	+ 9.0	55,273	54,261	+ 1.9	8,754,198	7,199,522	+ 21.6	379,016	323,222	+ 17.3	4.3	4.5
Marion Corp.	137,986	91,396	+ 51.0	7,317	6,298	+ 16.2	470,266	300,070	+ 56.7	22,420	19,879	+ 12.8	4.8	6.6
May Petroleum	8,227	3,301	+149.2	1,235	759	+ 62.7	24,675	13,846	+ 78.2	4,524	2,325	+ 94.6	18.3	16.8
McMoRan Oil & Gas	13,614	10,062	+ 35.3	1,326	874	+ 51.7	27,011[1]	17,643[1]	+ 53.1	9,334[1]	1,750[1]	+433.4	34.5	9.9
Mesa Petroleum	86,747	72,147	+ 20.2	33,979	16,361	+107.7	331,799	258,106	+ 28.6	95,236	54,203	+ 75.7	28.7	21.0
§Mobil Corp.	17,314,000	14,815,000	+ 16.9	565,000	538,000	+ 5.0	63,652,000	48,292,000	+ 31.8	2,819,000	2,007,000	+ 40.5	4.4	4.2
Murphy Oil	537,054	416,898	+ 28.8	45,610	38,021	+ 20.0	2,016,752	1,595,919	+ 26.4	150,547	103,581	+ 45.3	7.5	6.5
§Natomas Energy	193,600	137,700	+ 93.6	49,700	20,500	+142.4	792,000	492,000	+ 61.0	187,700	75,500	+148.6	23.7	15.3
Noble Affiliates	71,246	61,942	+ 15.0	13,092	11,170	+ 17.2	276,561	213,838	+ 29.3	47,199	33,041	+ 42.8	17.1	15.5
Occidental Petroleum	3,179,600	2,866,600	+ 10.9	138,100	186,800	- 26.1	12,476,100	9,554,800	+ 30.6	710,800	561,600	+ 26.6	5.7	5.9
Patrick Petroleum	16,839	8,369	+101.2	1,360	(358)		54,784	36,342	+ 50.7	3,209	1,701	+ 88.6	5.9	4.7
Peninsula Resources	4,669	3,027	+ 54.2	504	208	+142.3	15,609	10,397	+ 50.1	1,555	495	+214.1	10.0	4.8
Pennzoil Co.	659,422	603,064	+ 9.3	76,384	72,008	+ 6.1	2,483,015	2,051,693	+ 21.0	304,076	233,789	+ 30.1	12.2	11.4
Petroleum Development	1,422	3,795	- 62.5	142	171	- 17.0	12,430	10,301	+ 20.6	1,054	888	+ 18.6	8.5	8.6
Petro-Lewis	46,314	25,271	+ 83.3	8,184	3,274	+150.0	87,065[1]	48,321[1]	+ 80.2	15,516[1]	7,179[1]	+116.1	17.8	14.9
Phillips Petroleum	3,874,418	3,044,789	+ 27.2	286,973	306,491	- 6.4	13,712,879	9,744,750	+ 40.7	1,069,614	891,121	+ 20.0	7.8	9.1
Quaker State	222,065	178,494	+ 24.4	5,463	5,064	+ 7.9	832,494	691,641	+ 20.4	27,775	34,121	- 24.5	3.1	4.9
Seneca Oil[3]	3,783	917	+312.5	1,559	131	+1090.0	8,591	2,538	+238.5	2,220	178	+1147.2	25.8	7.0
Shell Oil	5,130,200	4,301,300	+ 19.0	408,600	331,200	+ 23.0	19,958,700	14,546,200	+ 37.0	1,541,600	1,125,600	+ 37.0	7.7	7.7
Southland Royalty	84,491	76,230	+ 14.8	9,924	16,962	- 70.9	366,571	256,611	+ 30.0	62,289	54,752	+ 12.1	17.0	21.3
§Standard California	10,834,000	9,543,000	+ 13.5	615,000	524,000	+ 17.3	41,553,000	30,938,000	+ 34.3	2,401,000	1,785,000	+ 34.5	5.8	5.8
§Standard Indiana	7,700,000	6,100,000	+ 26.2	402,200	368,700	+ 9.1	27,800,000	20,200,000	+ 37.6	1,915,300	1,506,600	+ 27.1	6.9	7.5
Statex Petroleum[4]	2,748	1,272	+116.0	988	206	+379.6	7,457	4,224	+ 76.5	1,862	787	+136.6	25.0	18.6
Sun Co.	4,100,000	3,200,000	+ 28.1	29,600	222,900	- 86.7	13,200,000	10,800,000	+ 22.2	722,800	699,900	+ 3.3	5.5	6.5
Superior Oil	440,720	302,625	+ 45.6	97,203	47,682	+103.9	1,497,695	1,085,394	+ 40.0	334,458	200,287	+ 67.0	22.3	18.5
Supron Energy	19,979	14,053	+ 42.2	6,406	4,796	+ 33.5	66,166	48,142	+ 37.4	20,093	14,420	+ 39.3	30.3	30.0
Tenneco	3,641,000	3,269,000	+ 11.4	200,000	164,000	+ 21.9	13,226,000	11,209,000	+ 18.0	726,000	571,000	+ 27.1	5.5	5.1
Tesoro	865,700	1,032,191	- 16.1	23,041	34,359	- 32.9	3,408,197	3,107,459	+ 9.7	82,572	72,096	+ 14.5	2.4	2.3
Texaco	14,058,300	12,012,200	+ 17.0	500,300	534,300	- 6.3	52,485,900	39,095,500	+ 34.3	2,240,200	1,759,100	+ 27.4	4.3	4.5
Texas Oil & Gas[2]	344,137	267,740	+ 29.0	40,365	29,259	+ 38.0	1,267,187	1,000,132	+ 26.7	152,222	107,266	+ 41.9	12.0	10.7
Tipperary Corp.	23,355	19,348	+ 20.7	1,944	2,734	- 28.9	91,801	66,685	+ 37.7	5,554	6,564	- 15.4	6.1	9.8
Tosco Corp.	680,642	549,185	+ 23.9	(9,837)	24,556		2,387,241	1,922,237	+ 24.2	46,096	78,028	- 40.9	1.9	4.1
Transcontinental Oil	20,668	17,999	+ 14.8	1,435	(134)		77,050	63,901	+ 20.6	2,395	(3,670)		3.1	
Union California	2,592,700	2,215,200	+ 17.0	177,249	152,305	+16.4	10,051,995	7,680,952	+ 30.9	647,000	500,604	+ 29.2	6.4	6.5
United Refining							664,370	502,917	+ 32.1	3,947	17,175	- 77.0	0.6	3.4
Universal Resources[4]	11,401	8,880	+ 28.4	2,352	1,102	+113.4	38,899	26,461	+ 47.0	7,222	2,929	+146.6	18.6	11.1
Wiser Oil	17,125	13,326	+ 28.6	6,386	4,928	+ 29.6	61,078	40,599	+ 50.4	17,911	13,258	+ 35.1	29.3	32.7
Woods Petroleum	14,588	11,838	+ 23.2	4,474	3,081	+ 45.2	64,683	43,159	+ 49.9	22,568	12,189	+ 85.2	34.9	28.3
TOTAL	139,312,790	117,222,209	+ 18.8	6,635,716	6,570,011	+ 1.0	512,584,648	389,371,639	+ 31.6	28,701,242	22,674,584	+ 26.6	5.6	5.8

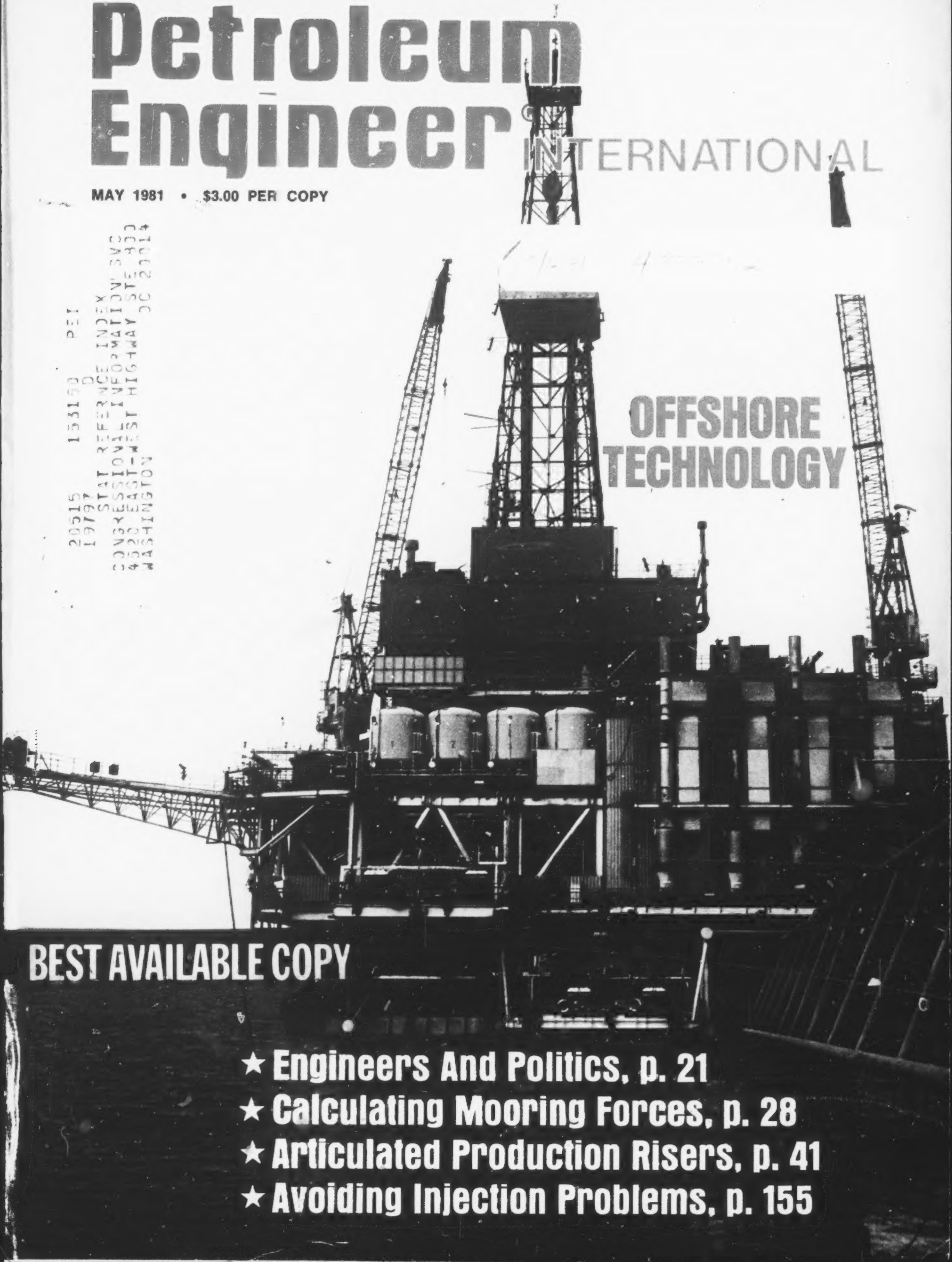
**Excluding non-recurring items. *Earnings available to common stock. #Earnings* divided by Revenues = Profit Margin. () Loss. §Revenues include excise taxes. [1] Six months. [2] Ends Nov. 30. [3] Ends Sept. 30. [4] Ends Oct. 31.

THE INTERNATIONAL MAGAZINE OF METHODS FOR ENGINEERING/OPERATING PEOPLE

Petroleum Engineer® INTERNATIONAL

MAY 1981 • $3.00 PER COPY

20515 153150 PEI
19797 D
STAT REFERENCE INDEX
CONGRESSIONAL INFORMATION SVC
4520 EAST-WEST HIGHWAY STE 300
WASHINGTON DC 20014



OFFSHORE TECHNOLOGY

BEST AVAILABLE COPY

★ Engineers And Politics, p. 21
★ Calculating Mooring Forces, p. 28
★ Articulated Production Risers, p. 41
★ Avoiding Injection Problems, p. 155

RECORD DRILLING PACE CONTINUES IN U.S.

U.S. drillers continue to set records almost unceasingly this year with a rig count that has increased by nearly 400 active rotaries since the beginning of 1981.

By the middle of last month, the number of active rigs counted by Hughes Tool Co. topped 3,700 for the first time, and only the annual spring slump north of the border kept the combined U.S. and Canada total from continuing above the 4,000 mark it had reached in March.

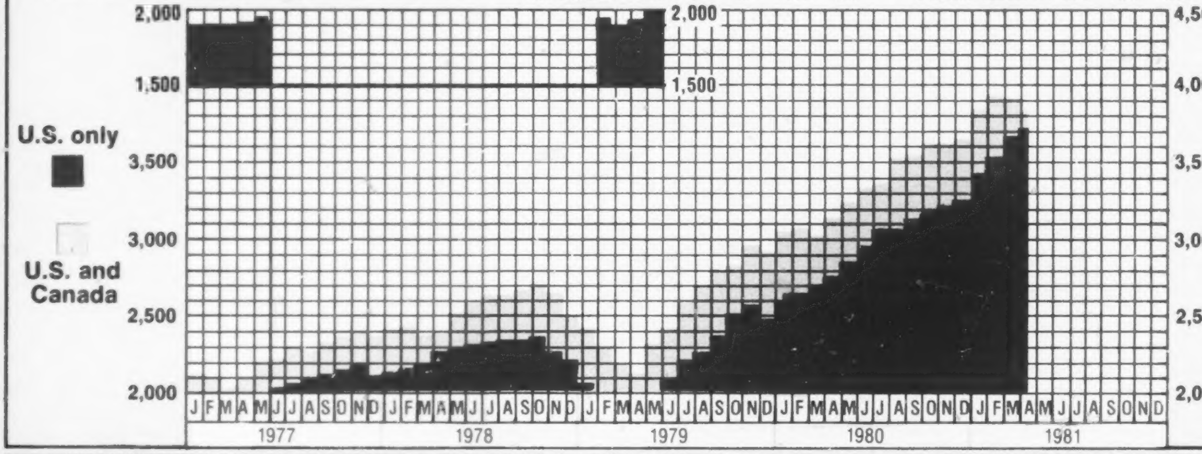
No fewer than eight states were credited with rig counts in three figures during the middle of April, and one state, Texas, had a count that was comfortably in four figures.

The average U.S. rig count for the first quarter of 1981 was 3,502, which is a 20% increase over last year's overall average of 2,916 active rigs, and a 33% increase over the 2,622 average for the first quarter of 1980.

Rotary Rigs Actually Making Hole In United States & Canada

As Reported to International Association of Drilling Contractors by Hughes Tool Company

	March 23, 1981	March 30, 1981	April 6, 1981	April 13, 1981
Alabama	13	14	14	15
Alaska				
Land	27	28	28	28
Offshore	1	3	3	3
Arkansas	31	35	35	36
Arizona	1	1	1	1
California				
Land	124	125	127	128
Offshore	19	19	19	20
Total	143	144	146	148
Colorado	70	74	65	56
Florida	10	10	11	11
Georgia				
Land	1	1	1	1
Hawaii	1	1	1	1
Idaho	4	3	4	3
Illinois	30	30	24	26
Kansas	182	182	188	191
Kentucky	3	3	3	2
North Louisiana	55	50	51	53
South Louisiana				
Inland Waters	88	87	90	99
Land	.154	153	153	153
Offshore	149	155	159	149
Total	446	445	453	454
Maryland	1	0	0	0
Michigan	16	34	32	30
Mississippi	66	67	70	73
Montana	73	77	74	82
Nebraska	14	8	14	14
Nevada	6	7	8	6
New Mexico	130	127	138	139
New York	7	8	6	7
North Dakota	107	104	114	117
Ohio	72	76	78	90
Oklahoma	615	617	631	636
Pennsylvania	37	37	37	29
Rhode Island				
Offshore	2	2	1	1
South Dakota	3	2	2	2
Tennessee	1	1	1	1
Texas				
Offshore	79	80	77	75
Dist. 1	71	72	72	73
Dist. 2	49	50	60	53
Dist. 3	216	226	222	232
Dist. 4	118	114	110	111
Dist. 5 & 6	148	150	145	150
Dist. 7B	84	78	80	74
Dist. 7C	89	90	83	89
Dist. 8	152	160	151	145
Dist. 8A	82	86	84	82
Dist. 9	85	81	82	79
Dist. 10	54	57	52	58
Total	1227	1244	1218	1221
Utah	67	70	63	69
Virginia	2	2	2	3
Washington	1	1	1	1
West Virginia	29	30	29	32
Wyoming	166	168	172	175
Total U.S.	3605	3656	3668	3704
Western Canada	354	247	186	156
Eastern Canada	4	4	4	4
U.S. and Canada	3963	3907	3858	3864



PETROLEUM ENGINEER INTERNATIONAL • 800 Davis Building • Dallas, Texas 75202 • **TWX** 910-861-9306

Abbott Sparks President
John G. Grant Publisher and Vice President
W. B. Bleakley Editor
Richard D. McNally Associate Editor
Steven D. Moore Technical Editor
Mary Jane Ellis Assistant Editor
Laura Jacobus Assistant Editor
Edna Taylor Editorial Assistant
J. E. (Hank) Kastrop Consulting Editor
Renn Rothrock, Jr. Consulting Editor
Ernestine Adams Editor, Energy Management Rpt.
Gregory Martin Editor, Energy News/Energy Week
Sharon Hutcheson Editorial Assistant

•

Brenda Hyde Promotion
Alan Hilton Service R&D Manager
Denise Tevis Service R&D Department
Olga Dunn Reader Service

ADVERTISING SALES OFFICES

EASTERN: Richard Martin, P.O. Box 89, Tennent, New Jersey 07763, (201) 446-3230
CHICAGO 60646: Bill Facinelli, Dwain Holmgren 4761 West Touhy Ave., Lincolnwood, Illinois (312) 679-1100
OHIO, WESTERN PA.: Dwain Holmgren, 4761 West Touhy Avenue, Lincolnwood, Illinois (312) 679-1100
LOS ANGELES 91106: Bruce Berkey, 61 S. Lake Ave., Box 4566, Pasadena, Calif., (213) 681-0685
HOUSTON 77027: Jess Adkins, Vice Pres., Gulf Coast Regional Manager, **Barry Biklen, Hal Odum,** 4151 Southwest Freeway, Suite 115, (713) 626-7850
DALLAS 75202: Ed Seeley, 800 Davis Bldg., (214) 748-4403, TWX 910-861-9306
WEST TEXAS: Rusty Meador, P.O. Box 611, Eldorado, Texas 76936 (915) 853-2689
UNITED KINGDOM, NETHERLANDS, SCANDINAVIA: Bryan Clark, Energy Publications Div. HBJ, 24/28 Oval Road, London NW1 7DX, England, (01) 485-7074 (OR 7075). Cable: HARBREX London NW1: Telex: 25775
FRANCE, ITALY, BELGIUM, SWITZERLAND: Gerard Lasfargues, 32, rue Desbordes Valmore, 75016-Paris, France, Telephone: 504 97 94
JAPAN: Mashy Yoshikawa, Orient Echo, Inc., 11th Floor Sankyo Bldg., 7-12 Tsukiji 2-chome, Chuo-ku, Tokyo, Telephone: 541-4923. Cable: MYORIENTECHO
GERMANY, AUSTRIA: S.I.P.A.S., Wim. J. M. Sanders, Paul J. Verbunt, Raadhuisstraat 24, P.O. Box 25, 1484 EN Graft-de Ryp, Holland, Telephone 02997-1303 and 3660. Telex: 13039 sipas nl, Telegrams: SIPAS-Amsterdam

Jane Dietz Production Department Manager
Don Fickert Graphics Director
Janell Fowler Production Manager
Debbie Cooper Production Coordinator
Dennis Howard Presentation
Laura Page Presentation
James Duke Presentation
Victoria Valentin Presentation

•

Gary Hogan Business Manager
Jack Schabel Circulation Director
Royal Courtney Circulation Fulfillment Manager

ENERGY PUBLICATIONS
• a Division of Harcourt Brace Jovanovich •
P.O. BOX 1589 • 800 DAVIS BUILDING
DALLAS, TEXAS 75221 • (214) 748-4403

PETROLEUM ENGINEER INTERNATIONAL
Pipeline & Gas Journal
Energy Management Report
Energy News • Energy Week

HBJ A HARCOURT BRACE JOVANOVICH PUBLICATION
ABP
ABC

EDITORIAL ADVISORY COMMITTEE
Lloyd E. Elkins, Petroleum Consultant
Bennie L. Franks, President, Sun Texas Co.
Dennis E. O'Brien, Technology Section Head, Exxon Chemical Company
B. R. Jones, President, Eagle Production and Drilling Co.
Frank Schuh, Director of Engineering Development, ARCO Oil and Gas Co., a Division of Atlantic Richfield Co.
Marius J. Mes, Senior Research Scientist, Production Research Department, Conoco Inc.

PETROLEUM ENGINEER INTERNATIONAL (USPS 429-380) published 15 times each year, monthly plus March 15, July 15 and November 15, by Energy Publications Division, Harcourt Brace Jovanovich, P.O. Box 1589, Dallas, Texas 75221.
April, 1981, Volume 53, No. 5.

Copyright ©1981 by Harcourt Brace Jovanovich, Inc. All rights reserved. No part of this publication may be transmitted or reproduced in any form or by any means, electronic or mechanical, including photocopy, recording, or any information storage and retrieval system, without permission in writing from the publisher.

Subscription rate to personnel employed by companies involved with exploration, drilling, production, or field processing of oil or gas: one year $12.00, two years $18.00, three years $24.00 for North, Central, and South America. Outside North, Central, and South America: one year $25.00, two years $35.00, three years $45.00. Subscription rate for all others: $25.00 for one year. Single copy price $3.00. Second class postage paid at Duluth, MN and additional mailing offices. Microfilm copies are available through University Microfilms, Inc., 313 North First Street, Ann Arbor, Michigan. Indexed by Applied Science, Technology Index and the Engineering Index, Inc.

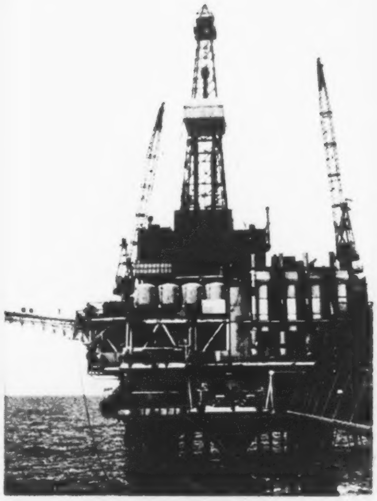
Postmaster: Send address changes to PETROLEUM ENGINEER INTERNATIONAL, P.O. Box 1589, Dallas, Texas 75221, USA.

HARCOURT BRACE JOVANOVICH PUBLICATIONS
ROBERT L. EDGELL, Chairman; RICHARD MOELLER, President; LARS FLADMARK, Executive Vice President; ARLAND HIRMAN, Treasurer; JOE BILDERBACH, Vice President; JAMES GHERNA, Vice President; GEORGE GLENN, Vice President; THOMAS GRENEY, Vice President; EZRA PINCUS, Vice President; HARRY RAMALEY, Vice President; ABBOTT SPARKS, Vice President. OFFICES: 757 Third Avenue, New York, N.Y. 10017. Phone (212) 888-4444; 1 East First Street, Duluth, Minnesota 55802. Phone (218) 727-8511. 111 East Wacker Drive, Suite 1730, Chicago, Ill. 60601. Phone (312) 938-2300.

BEST AVAILABLE COPY

Petroleum Engineer® INTERNATIONAL

The international magazine of methods for engineering/operating people
MAY 1981 NUMBER 6 VOLUME 53



ABOUT THE COVER: A Loffland Brothers rig is shown drilling development wells for the Phillips Norway Group from a platform in the Greater Ekofisk area of the Norwegian North Sea, approximately 200 miles southwest of Stavanger. (Photo by Tom Smith)

NEXT MONTH: An in-depth look at international operations in June will take into account the opinions of major and independent petroleum concerns as well as drilling contractors.

OFFSHORE TECHNOLOGY

Sun Executive Talks About Engineers, Government, And Politics 21
Exclusive interview with John L. Olsen, Sun Co.

Hand-Held Calculator Program Yields Mooring Line Forces 28
by Marius J. Mes, Conoco Inc.

Modern Production Risers—Part 8 41
by Ross Cowan, Lockheed Missiles and Space Co.

Charts Help Avoid Vibration Problems 68
Staff Report

Conquering Alaska's Arctic Drilling Problems—Part 1 79
by Steven D. Moore, Technical Editor

Systems Analysis Hikes Well Performance 96
by Eni P. Kanu, Johnston-Macco/Schlumberger

Drilling Comanche County's Overpressured Formations 124
by Steven D. Moore, Technical Editor

How To Check Reserve Estimates in Tight, Transmissible Gas Reservoirs—Part 2 133
by Mihir K. Sinha, Rocky Mountain Petroleum Consultants Inc.

Well Completions And Workovers—Part 14 137
by L. Douglas Patton, Sargent Industries Inc., and W.A. Abbott, Great Eastern Energy and Development Co.

Solving Injection Well Problems 155
by W. M. Hensel Jr., R.L. Sullivan, and R. H. Stallings, Sun Production Co.

EDITORIAL DEPARTMENTS

News Hi-lites 1
Significant Happenings in Petroleum
Course of Oil 6
Governments Don't Think
Technology Trends 8
Forecasts from Current Events
Offshore Technology 10
Panarctic Taps Oil
PE Quiz 150
by Duane A. Crawford
Continuous Tables 173
Drilling/Exploration 17
Well Costs Up 23%
Industry Meeting Calendar 18
Petroleum Profiles 18
Five minutes with Glenn Simpson
Company News 20
Professional Directory 21
Index to Advertisers EM 2

ENERGY management report™

by Ernestine Adams

Comment EM 3
Energy World Report EM 4
Capital Expenditures Increase EM 6
Financial Notebook EM 7
Oil & Gas Professional Opportunities EM 10
Books to Read EM 21
New Products EM 22

BEST AVAILABLE COPY

Drilling/Exploration Activities...

Well Costs Up By 23% In U.S.

Costs of drilling and equipping wells in the U.S. during 1978 and 1979

	Oil wells		Gas wells		Dry holes		Total wells	
	1978	1979	1978	1979	1978	1979	1978	1979
Wells drilled	17,790	19,243	13,306	14,079	15,559	15,201	46,655	48,523
Footage drilled, 000	74,411	80,261	72,819	77,340	83,389	79,911	230,619	237,512
Total cost, millions*	$3,700	$4,679	$4,979	$6,238	$4,382	$5,162	$13,061	$16,079
Average depth, feet	4,182	4,170	5,472	5,493	5,359	5,256	4,943	4,894
Average cost per well*	$207,983	$243,130	$374,178	$443,080	$281,653	$339,598	$279,950	$331,367
Average cost per foot*	$49.72	$58.29	$68.37	$80.66	$52.55	$64.60	$56.63	$67.70

*Includes all costs incurred for drilling and equipping wells through the Christmas tree.

The total cost of drilling and equipping oil and gas wells and dry holes in 1979 increased by 23.1% over 1978 to total more than $16 billion.

And, while the average depth of wells drilled in 1979 decreased by almost 50 ft, average cost per well was up by 18%. Average cost per foot increased by $11.07 during the year to reach $67.70.

These are among findings of the Joint Association Survey on Drilling Costs for 1979. The survey is issued annually by the American Petroleum Institute and is based on data collected from the petroleum industry by API, the Independent Petroleum Association of America, and the Mid-Continent Oil and Gas Association.

Average depth of oil wells completed in 1979 was 4,170, a decrease of 0.3%. Average cost per foot, on the other hand, was up by 17.2% in 1979 over the cost for 1978's oil wells. Average cost per foot for oil wells in 1979 was $58.29.

Cost per foot for gas wells was the highest of all three well categories for the year, reaching an average of $80.66, compared with $68.37 in 1978. Average depth of gas wells in 1979 was 5,493 ft, an increase of 0.4% from 1978.

Dry holes drilled in 1979 reached an average total depth of 5,256 ft, a decrease of 1.9%. The average cost per foot for dry holes was $64.60, an increase of 22.9% over 1978.

The total number of wells completed in 1979 increased 4%, and total footage drilled increased 3%.

Offshore, the total cost of wells completed in 1979 came to more than $3.2 billion, an increase of 24.4% over 1978. The total number of offshore wells increased 5.3% over 1978, while their average depth increased 0.1%. The average cost per foot offshore in 1979 was $258.79, an increase of 18.1%

On a state-by-state basis, Kentucky has regained its status as the most inex-

Estimated costs of drilling and equipping wells in the U.S. by depth intervals (1979)

Depth interval, ft	Total number of wells, average depth, and cost per well				
		Oil	Gas	Dry	Total
0 to 1,249	Wells	3,124	812	1,407	5,343
	Avg depth	830	893	752	819
	Avg cost, $	27,652	28,250	21,387	26,078
1,250 to 2,499	Wells	3,679	2,249	2,135	8,063
	Avg depth	1,832	1,986	1,892	1,891
	Avg cost, $	65,551	63,570	47,669	60,263
2,500 to 3,749	Wells	3,754	2,607	2,723	9,084
	Avg depth	3,117	3,178	3,138	3,141
	Avg cost, $	107,543	106,909	74,392	97,424
3,750 to 4,999	Wells	2,570	2,231	2,540	7,341
	Avg depth	4,390	4,328	4,372	4,365
	Avg cost, $	165,405	148,336	109,387	140,835
5,000 to 7,499	Wells	2,994	2,679	2,962	8,653
	Avg depth	6,081	6,075	6,090	6,082
	Avg cost, $	295,382	293,021	212,947	266,428
7,500 to 9,999	Wells	2,243	1,609	1,609	5,461
	Avg depth	8,581	8,753	8,622	8,644
	Avg cost, $	575,736	732,112	518,218	604,863
10,000 to 12,499	Wells	597	1,091	1,027	2,715
	Avg depth	10,984	11,087	11,060	11,054
	Avg cost, $	1,235,462	1,264,331	1,039,759	1,173,035
12,500 to 14,999	Wells	228	490	503	1,221
	Avg depth	13,301	13,559	13,505	13,488
	Avg cost, $	1,937,921	2,044,331	1,689,753	1,878,390
15,000 to 17,499	Wells	48	209	185	442
	Avg depth	15,969	16,106	16,088	16,084
	Avg cost, $	2,971,925	3,169,246	3,019,871	3,085,296
17,500 to 19,999	Wells	2	64	83	149
	Avg depth	18,698	18,517	18,536	18,530
	Avg cost, $	2,636,369	4,403,905	4,544,039	4,458,241
20,000 & over	Wells	4	20	27	51
	Avg depth	21,631	22,103	21,504	21,749
	Avg cost, $	4,777,025	8,453,415	8,584,738	8,234,595
Totals	Wells	19,243	14,079	15,201	48,523
	Avg depth	4,170	5,493	5,256	4,894
	Avg cost, $	243,130	443,080	339,598	331,367

pensive state in which to drill. It had lost the title to Indiana in 1978, but regained it in 1979 by an average of just under $60/well. Kentucky's 885 wells in 1979 reached an average total depth of 1,418 ft, and cost an average of $40,038 to drill and equip. Indiana was home to 478 wells, but their total depth averaged 1,884 ft, and they cost an average of $40,094. On a cost-per-foot basis, therefore, Indiana comes out cheapest by about $7. Only one of Indiana's wells in 1979 was drilled deeper than 3,750 ft, while Kentucky had 28 wells that were deeper.

Kentucky's costs, by the way, represented a decrease of more than $5,000/well since the previous Joint Association Survey (for 1978). And Kentucky was not alone. Other states experiencing a decline in per-well costs during 1979 include Alaska, Florida, and Mississippi.

Despite their declines, Alaska and Florida remained the most expensive states in which to drill. Alaska's 83 wells in 1979 cost an average of $3,800,383 to drill and equip. Their average depth, however, was 10,991 ft.

Florida had only one well that was shallower than 10,000 ft in 1979, and the 25 that were drilled deeper than 10,000 ft brought the average cost per foot in the Sunshine State to just about $100.

Among the most active states, Louisiana continues to be among the most expensive. The state's 4,230 wells cost close to $1 million apiece in 1979, and cost per foot rose to $133 during the year from the 1978 level of $112/ft.

Texas, of course, still is the most active state, with Oklahoma a distant second. Both states, however, came in with comparable depth and cost averages. Louisiana and Kansas continue to vie for third and fourth places, but Louisiana is doing so at a cost that is about 12 times as high as the cost being borne by Kansas. Wells in Kansas, of course, are less than half as deep as those in Louisiana.

North Dakota moved past Mississippi in 1979 as the third ranked state in the matter of average well depth. That state's 442 wells touched bottom at an average depth of 8,932 ft. Mississippi's average well depth, which had been above 9,000 ft in 1978, slipped to 8,762 ft in 1979.

Federal waters offshore Alaska and the Atlantic Coast continue to be the most costly drilling areas in the U.S., with the average well cost in 1979 topping $5.5 million. Northern waters of the Gulf of Mexico were not too far behind, with an average cost per well of more than $4 million. This compares with per-well costs for Gulf of Mexico wells offshore Louisiana of $2.3 million, and offshore Texas of $2.7 million. Average well depths in the three areas were comparable.

Complete copies of the Joint Association Survey are available from API at 2101 L St. NW, Washington, D.C. 20037. Price per copy is $12.

U.S. wells by states, with average depths and costs, 1979

State	Wells	Avg depth	Avg cost, $
Alabama	215	6,606	539,312
Alaska	83	10,991	3,800,383
Arkansas	490	4,958	190,973
California	1,970	3,077	256,185
Colorado	1,064	5,086	205,750
Florida	26	12,547	1,222,134
Illinois	1,122	2,678	63,598
Indiana	478	1,884	40,094
Kansas	4,258	3,358	74,241
Kentucky	885	1,418	40,038
Louisiana	4,230	7,054	943,827
Michigan	481	4,740	245,940
Mississippi	505	8,762	532,683
Montana	757	3,994	208,834
Nebraska	429	4,294	85,569
New Mexico	1,586	5,784	320,534
North Dakota	442	8,932	701,035
Oklahoma	6,286	5,091	304,022
Texas	15,022	5,416	325,590
Utah	272	6,067	752,944
Wyoming	1,272	7,685	734,092
Appalachia[1]	6,214	3,327	104,355
Offshore Fed Waters[2]	57	10,791	5,572,133
Gulf of Mexico (North)	36	9,929	4,186,167

1. Includes New York, Ohio, Pennsylvania, and West Virginia
2. Includes federal waters offshore Alaska and the Atlantic Coast

McCormick Extends Cotton Valley Streak

McCormick Oil & Gas Co. has completed its 44th consecutive successful Cotton Valley gas well in the Oak Hill field in Rusk County, Texas.

The No. 4 Thornton gas unit was completed in Cotton Valley sands from 10,265 to 10,568 ft and flowed 2.9 MMcfd of gas and 3 b/d of condensate through a 16/64-in. opening.

Drilling Shows Promise In Gulf of Thailand

Texas Pacific Thailand Inc., operator for an international consortium, has another gas and condensate discovery in the southern sector of B Structure field in the Gulf of Thailand.

The wildcat 16-F-1, located in Block 16, approximately 1.6 miles from the nearest well in the field, was completed after drillstem testing, through pipe, from four separate Miocene sandstone zones at a combined rate of approximately 34.5 MMcfd, 384 b/d of condensate, with some CO_2 and water. An additional four sandstone zones were wireline tested and indicated to be hydrocarbon productive. The well is in a separate fault block from other wells in the field, and was drilled to a total depth of 8,380 ft. Water depths in the area are in the 250-ft range.

The B Structure field is located approximately 130 miles northeast of Songkhla in southern Gulf of Thailand waters. According to previous reports by the Thai government, it may be the largest hydrocarbon accumulation in Thailand.

Supron Discovery In North Dakota

Supron Energy Corp.'s F-6-2 wildcat has been completed as a significant oil producer in the Duperow formation on the company's Magpie Creek prospect in Billings County, North Dakota. Nearest production in this formation is approximately 6½ miles to the southeast.

The well tested 1,560 b/d of 45° gravity oil on a 24/64-in. choke with a flowing tubing pressure of 1,000 psi. The well was drilled to a total depth of 13,003 ft, with the perforated interval at 11,044-54 ft.

CAPITAL EXPENDITURES INCREASE

FORECASTERS WALK ON SHAKY GROUND and never have indicators been more vacillating than today. This year and next U.S. will have the heaviest investments, mostly in exploration and development. Foreign exploration and development will balloon in the future when oil-exporting nations realize that finding and developing oil must continue indefinitely.

Algeria and Libya have proclaimed the need for foreign technology and demanded training for their people and technical aid in return for oil. They receive training and technical management but when foreigners leave, so goes the will and ability to operate the industry.

Atlantic Richfield cancelled two Nigerian contracts this year, an instant picture of the oil glut. There could be more cancellations, especially if the all-out exploration and drilling programs in the U.S. are half-way successful. Ashland reportedly stopped buying 90,000 b/d oil from Mexico and 17,000 b/d from Cameroon at quarterly review time. It seems the company has adequate and better supplies at lower rates.

Saudi Arabia has been telling OPEC for years the members would get in a bind with their headlong race for ever higher prices. Now it appears the chips are down and Saudi is prepared to rule the cartel. Saudi has been smart enough to keep Aramco, the only continuous oil operations management in place since 1948.

One factor that will create high capital expenditures and small profit, or losses, is OPEC members' determination to become involved in "downstream" activities--refining, chemicals, etc. An upswing in 1981 spending for these facilities is in prospect. This includes expansion of marine transport.

Non-communist world capital and exploratory expenditures are less this year than most predictions--up 16% in USA and 11% for total. Including the communist bloc would change the table very little. The communist system is not much better for oil operations than it is for food production. If any sizeable project is attempted it will probably be financed by outsiders.

ESTIMATED CAPITAL AND EXPLORATORY EXPENDITURES FOR FACILITIES AND RESERVES
(U.S. and Non-Communist Countries -- Millions of Dollars -- current Dollars)

	1980			1981[E]			1982[E]		
	USA	NON-USA	TOTAL	USA	NON-USA	TOTAL	USA	NON-USA	TOTAL
Oil & Gas*	32,400	17,200	$49,600	37,200	16,100	$53,300	37,400	19,500	$56,900
Manufacturing**	5,100	12,860	17,960	5,900	14,260	20,160	6,100	12,180	18,280
Marketing	1,170	2,400	3,570	1,090	2,940	4,030	1,210	3,100	4,310
Liquid Pipelines+	1,100	5,060	6,160	1,370	5,500	6,870	1,670	5,600	7,270
Marine Transport	3,700	6,700	10,400	3,100	7,400	10,500	2,900	7,700	10,600
Other Energies++	4,660	4,040	8,700	5,350	4,810	10,160	6,500	3,600	10,100
Miscellaneous	1,050	1,200	2,250	2,200	2,390	4,590	3,060	3,400	6,460
Sub total	49,180	49,460	$98,640	56,210	53,400	$109,610	58,840	55,080	$113,920
Gas Pipelines‡‡	5,800	4,800	10,600	7,790	5,100	12,890	9,000	5,300	14,300
LNG/SNG+	630	2,220	2,850	400	1,000	1,400	550	1,300	1,850
Sub total	6,430	7,020	$13,450	8,190	6,100	$14,290	9,550	6,600	$16,150
TOTAL	55,610	56,480	$112,090	64,400	59,500	$123,900	68,390	61,680	$130,070

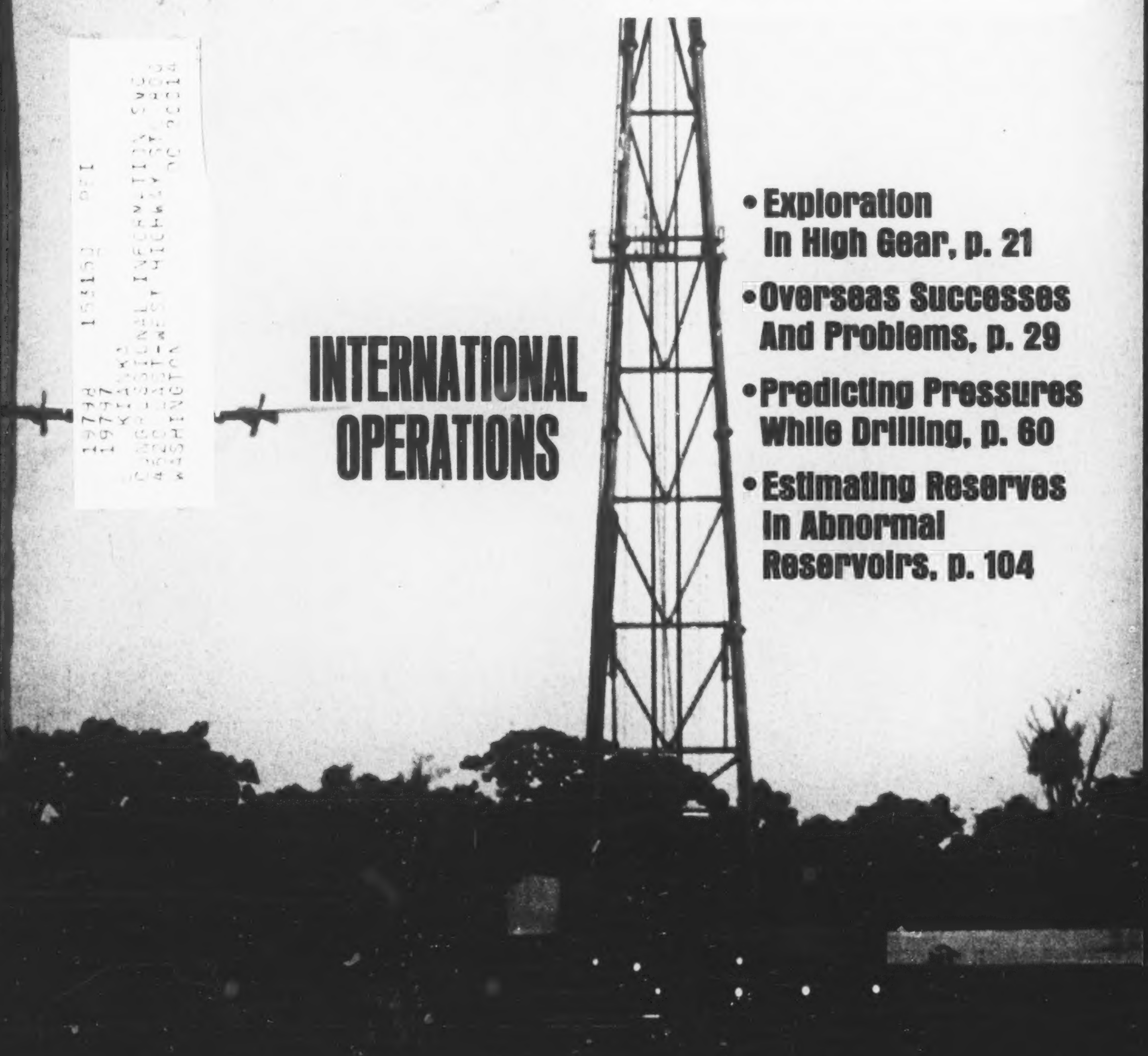
[E] Estimate. *Includes exploration and development. **Refining and petrochemical investment by oil/gas companies. +Pipeline & Gas Journal estimates. ++Coal, nuclear, shale oil, tar sands, geothermal, etc., expenditures by oil and gas companies. ‡Energy related investment. ‡‡Transmission and distribution capital estimates by Pipeline & Gas Journal. Only change in 1980 is "Oil & Gas" which late in year went up $2 billion.

THE INTERNATIONAL MAGAZINE OF METHODS FOR ENGINEERING/OPERATING PEOPLE

Petroleum Engineer INTERNATIONAL

JUNE 1981 • $3.00 PER COPY

6/14/81 C 3220-2



CONGRESSIONAL INFORMATION SVC
4520 EAST-WEST HIGHWAY
WASHINGTON DC 20014

INTERNATIONAL OPERATIONS

- Exploration in High Gear, p. 21
- Overseas Successes And Problems, p. 29
- Predicting Pressures While Drilling, p. 60
- Estimating Reserves in Abnormal Reservoirs, p. 104

BEST AVAILABLE COPY

U.S. Average Up By More Than 900 Rigs

U.S. drillers are averaging more than 900 more rigs per week this year than they were at the same time in 1980, and the active rig count at mid-May topped the figure for the same week a year earlier by more than 1,000.

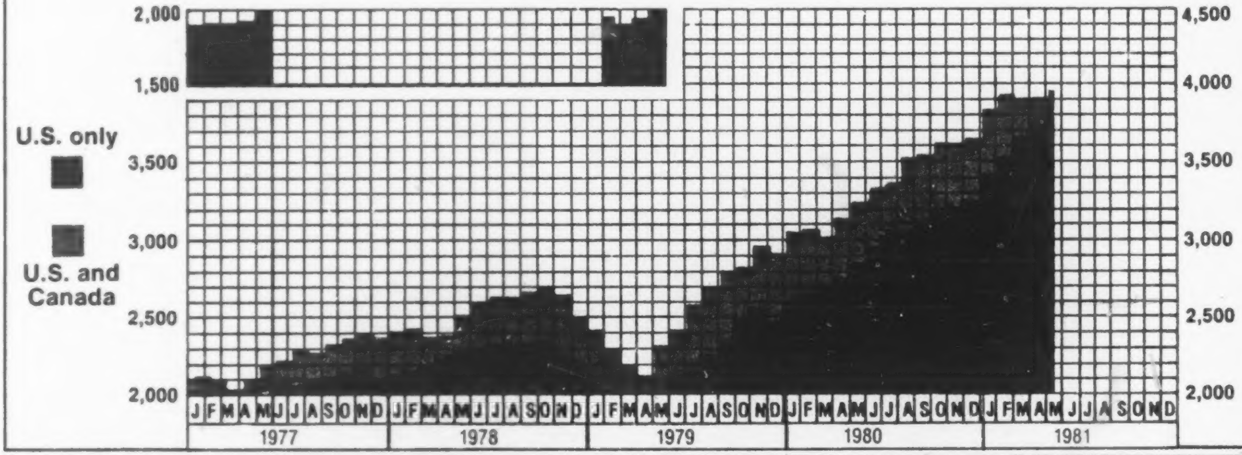
Offshore drilling in the U.S. is up also this year, but it accounts for a lower percentage of total drilling than it did in 1980. This year's 248 active offshore rigs comprise 6.5% of the total. Last year at this same time there were 235 active rigs offshore, and they represented 8.4% of all rigs turning.

Canadian drilling continues to limp along during the period of this report, but this is normal during the spring thaw. If activity north of the border hasn't picked up by mid-June, however, predictions of wholesale rig exodus will be said to have come true.

Rotary Rigs Actually Making Hole In United States & Canada

As Reported to International Association of Drilling Contractors by Hughes Tool Company

	April 20, 1981	April 27, 1981	May 4, 1981	May 11, 1981
Alabama	17	11	20	16
Alaska	28	23	22	22
Offshore	3	3	3	2
Total	31	26	25	24
Arkansas	34	31	29	31
Arizona	1	1	1	1
California Land	130	131	129	129
Offshore	20	20	20	20
Total	150	151	149	149
Colorado	66	71	69	71
Florida Land	7	7	7	6
Offshore	3	2	3	3
Total	10	9	10	9
Georgia Land	1	2	0	0
Hawaii	1	1	1	1
Idaho	3	3	3	3
Illinois	26	25	26	27
Kansas	193	194	196	197
Kentucky	2	2	2	2
North Louisiana	54	56	57	57
South Louisiana				
Inland Waters	88	84	79	82
Land	158	152	155	153
Offshore	151	152	155	149
Total	451	444	446	441
Maryland	0	0	1	1
Michigan	34	35	38	36
Mississippi	72	78	72	68
Montana	85	82	87	87
Nebraska	16	16	14	14
Nevada	7	9	9	8
New Mexico	137	144	142	131
New York	6	6	6	6
North Dakota	123	117	116	115
Ohio	92	89	95	93
Oklahoma	643	656	653	653
Oregon	0	1	1	1
Pennsylvania	34	36	34	35
Rhode Island				
Offshore	1	1	1	1
South Dakota	2	2	2	1
Texas				
Offshore	77	75	75	73
Dist. 1	75	77	69	83
Dist. 2	54	60	70	57
Dist. 3	230	238	242	236
Dist. 4	112	112	114	115
Dist. 5 & 6	150	151	160	160
Dist. 7B	82	91	88	90
Dist. 7C	88	91	91	89
Dist. 8	153	148	139	153
Dist. 8A	83	84	80	83
Dist. 9	73	76	78	77
Dist. 10	59	56	58	60
Total	1237	1259	1264	1276
Utah	65	67	66	71
Virginia	3	3	2	2
Washington	1	1	1	1
West Virginia	35	35	38	38
Wyoming	177	176	182	185
Total U.S.	3756	3784	3801	3795
Western Canada	145	146	144	152
Eastern Canada	4	4	3	3
U.S. and Canada	3905	3934	3948	3950



PETROLEUM ENGINEER INTERNATIONAL • 800 Davis Building • Dallas, Texas 75202 • TWX 910-861-9306

Abbott Sparks	President
John G. Grant	Publisher and Vice President
W. B. Bleakley	Editor
Richard D. McNally	Associate Editor
Steven D. Moore	Technical Editor
Mary Jane Ellis	Assistant Editor
Laura Jacobus	Assistant Editor
Edna Taylor	Editorial Assistant
J. E. (Hank) Kastrop	Consulting Editor
Renn Rothrock, Jr.	Consulting Editor
Ernestine Adams	Editor, Energy Management Rpt.
Gregory Martin	Editor, Energy News/Energy Week
Sharon Hutcheson	Editorial Assistant
Brenda Hyde	Promotion
Alan Hilton	Service R&D Manager
Denise Tevis	Service R&D Department
Olga Dunn	Reader Service

Jane Dietz	Production Department Manager
Don Fickert	Graphics Director
Janell Fowler	Production Manager
Debbie Cooper	Production Coordinator
Dennis Howard	Presentation
Laura Page	Presentation
James Duke	Presentation
Victoria Valentin	Presentation
Gary Hogan	Business Manager
Jack Schabel	Circulation Director
Royal Courtney	Circulation Fulfillment Manager

ADVERTISING SALES OFFICES

EASTERN: Richard Martin, P. O. Box 89, Tennent, New Jersey 07763, (201) 446-3230

CHICAGO 60646: Bill Facinelli, Dwain Holmgren 4761 West Touhy Ave., Lincolnwood, Illinois (312) 679-1100

OHIO, WESTERN PA.: Dwain Holmgren, 4761 West Touhy Avenue, Lincolnwood, Illinois (312) 679-1100

LOS ANGELES 91106: Bruce Berkey, 61 S. Lake Ave., Box 4566, Pasadena, Calif., (213) 681-0685

HOUSTON 77027: Jess Adkins, Vice Pres., Gulf Coast Regional Manager, **Barry Biklen, Hal Odum**, 4151 Southwest Freeway Suite 115, (713) 626-7850

DALLAS 75202: Ed Sealey, George Galloway, 800 Davis Bldg., (214) 748-4403, TWX 910-861-9306

WEST TEXAS: Rusty Meador, P. O. Box 611, Eldorado, Texas 76936 (915) 853-2689

UNITED KINGDOM, NETHERLANDS, SCANDINAVIA: Bryan Clark, Energy Publications Div. HBJ, 24/28 Oval Road, London NW1 7DX, England, (01) 485-7074 (OR 7075). Cable: HARBREX London NW1: Telex: 25775

FRANCE, ITALY, BELGIUM, SWITZERLAND: Gerard Lasfargues, 32, rue Desbordes Valmore, 75016-Paris, France, Telephone: 504 97 94

JAPAN: Mashy Yoshikawa, Orient Echo, Inc., 11th Floor Sankyo Bldg., 7-12 Tsukiji 2-chome, Chuo-ku, Tokyo, Telephone: 54 -4923, Cable: MYORIENTECHO

GERMANY, AUSTRIA: S.I.P.A.S., Wim. J. M. Sanders, Paul J. Verbunt, Raadhuisstraat 24, P. O. Box 25, 1484 EN Graft-de Ryp, Holland, Telephone 02997-1303 and 3660. Telex: 13039 sipas nl, Telegrams: SIPAS-Amsterdam

ENERGY PUBLICATIONS
• a Division of Harcourt Brace Jovanovich •
P.O. BOX 1589 • 800 DAVIS BUILDING
DALLAS, TEXAS 75221 • (214) 748-4403

PETROLEUM ENGINEER INTERNATIONAL
Pipeline & Gas Journal
Energy Management Report
Energy News • Energy Week

A HARCOURT BRACE JOVANOVICH PUBLICATION

ABP

ABC

EDITORIAL ADVISORY COMMITTEE
Lloyd E. Elkins, Petroleum Consultant
Bennie L. Franks, President, Sun Texas Co.
Dennis E. O'Brien, Technology Section Head, Exxon Chemical Company
B. R. Jones, President, Eagle Production and Drilling Co.
Frank Schuh, Director of Engineering Development, ARCO Oil and Gas Co., a Division of Atlantic Richfield Co.
Marius J. Mes, Senior Research Scientist, Production Research Department, Conoco Inc.

PETROLEUM ENGINEER INTERNATIONAL (USPS 429-380) published 15 times each year, monthly plus March 15, July 15 and November 15, by Energy Publications Division, Harcourt Brace Jovanovich, P. O. Box 1589, Dallas, Texas 75221.

June, 1981, Volume 53, No. 7. Copyright © 1981 by Harcourt Brace Jovanovich, Inc. All rights reserved. No part of this publication may be transmitted or reproduced in any form or by any means, electronic or mechanical, including photocopy, recording, or any information storage and retrieval system, without permission in writing from the publisher. Subscription rate to personnel employed by companies involved with exploration, drilling, production, or field processing of oil or gas: one year $12.00, two years $18.00, three years $24.00 for North, Central, and South America. Outside North, Central, and South America: one year $25.00, two years $35.00, three years $45.00. Subscription rate for all others: $25.00 for one year. Single copy price $3.00. Second class postage paid at Duluth, MN and additional mailing offices.

Microfilm copies are available through University Microfilms, Inc., 313 North First Street, Ann Arbor, Michigan. Indexed by Applied Science, Technology Index and the Engineering Index, Inc.

Postmaster: Send address changes to PETROLEUM ENGINEER INTERNATIONAL, P.O. Box 1589, Dallas, Texas 75221, USA.

HARCOURT BRACE JOVANOVICH PUBLICATIONS

ROBERT L. EDGELL, Chairman; RICHARD MOELLER, President; LARS FLADMARK, Executive Vice President; ARLAND HIRMAN, Treasurer; JOE BILDERBACH, Vice President; JAMES GHERNA, Vice President; GEORGE GLENN, Vice President; THOMAS GRENEY, Vice President; EZRA PINCUS, Vice President; HARRY RAMALEY, Vice President; ABBOTT SPARKS, Vice President. OFFICES: 757 Third Avenue, New York, N.Y. 10017. Phone (212) 888-4444; 1 East First Street, Duluth, Minnesota 55802. Phone (218) 727-8511. 111 East Wacker Drive, Suite 1730, Chicago, Ill. 60601. Phone (312) 938-2300.

Petroleum Engineer® INTERNATIONAL

The international magazine of methods for engineering/operating people

JUNE 1981 NUMBER 7 VOLUME 53

ABOUT THE COVER:
A C-130 transport comes in past the Texaco-Amoco drilling rig it carried into the remote Peten area of northern Guatemala. For a roundup of drilling activity that is moving into many such remote areas of the world, see p. 21.

NEXT MONTH: Practical aspects of downhole technology will be featured in the July issue, which will also present an update of PEI's exclusive survey of downhole equipment and repairs.

INTERNATIONAL DRILLING AND PRODUCING

Worldwide Exploration In Forward Gear 21
by Rich McNally, Associate Editor

How U.S. Oilmen View International Operations 29
by W. B. Bleakley, Editor

Phillips VP Says: "Go Overseas, Young Man, But Don't Sell Your House" 30

Delhi President Speaks For The International Independent 40

Two Drilling Contractors Analyze Overseas Problems 48

Special Meritorious Awards For Engineering Innovation 58

Determining Frac Gradients While Drilling 60
by Renzo Cesaroni, Diego Giacca, and Adelmo Schenato, AGIP SpA, and Bernard Thierree, Geoservices

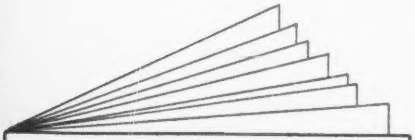
Continental Drilling Takes First Delivery 88
Staff Report

Conquering Alaska's Arctic Drilling Problems – Part 2 90
by Steven D. Moore, Technical Editor

Predicting Gas In Place In Abnormal Reservoirs 104
by Otis V. Stelly II and Fred F. Farshad, University of Southwestern Louisiana

Well Completions And Workovers – Part 15 112
by L. Douglas Patton, Keplinger Operating Co., and W. A. Abbott, Great Eastern Energy and Development Corp.

Plastic Liner Reinforces Flow Lines 126
Staff Report



ENERGY management report™

by Ernestine Adams

Comment EM 1
Energy World Report EM 2
First Quarter Report EM 4
Financial Notebook EM 9
Oil & Gas Professional Opportunities EM 10
New Products EM 16

EDITORIAL DEPARTMENTS

News Hilites 1
Significant Happenings in Petroleum
Course of Oil 6
Needed: An Even Break For Expatriates
Technology Trends 8
Forecasts from Current Events
Offshore Technology 10
Deep Diving Records
PE Quiz 137
by George V. Chilingar
Continuous Tables 139
Drilling/Exploration 142
Do You Remember? 148
Industry Meeting Calendar 152
Company News 154
Petroleum Profiles 161
Five minutes with Richard M. Morrow
Book Reviews 174
Professional Directory 174
Index to Advertisers EM 20

A Loffland Brothers Co. tender-supported drilling rig is shown on a deep-well contract in Lake Maracaibo, Venezuela. Loffland has been drilling in Venezuela since 1946.

The worldwide search for alternative supplies of oil and gas has been an on-again, off-again thing ever since the Arab oil embargo of 1973, while oil price increases were strictly on-again.

But all that is changing. Energy exploration is finally in forward gear, and world prices for oil now are high enough to convince consumers that there really is an energy crisis after all. The result is increased production from nations that are not members of the Organization of Petroleum Exporting Countries, plus reduced consumption worldwide.

Forecasters no longer are talking about 40 million b/d of oil from OPEC by the year 2000. Rather, world demand for oil from the 13 OPEC members now is projected to amount to less than 12 million b/d by the end of the century. OPEC this year is expected to provide no more than 25 million b/d, which will be a 20% reduction from the 31.6 million b/d of oil supplied to the Free World by OPEC in 1979.

That is what is behind recent moves by some OPEC members toward a stabilized price for oil. They've come to the realization that $40/bbl is about as high as the price of crude ought to be, because that is the generally recognized cost of producing synthetic oil from shale.

This means King Crude can expect to retain its crown as the world's prime energy source for the rest of this century at least. And it also means that the international search for oil and gas, which currently is at an all-time high, will continue apace.

The U.S. provides a good case in point. The rotary rig count has been setting modern records each week this year almost without fail, and so has the monthly seismic crew count. And the exploration geophysicists are not only out there in record numbers, they're utilizing technology that has been developed in the past few years to improve the quality of seismic readouts — including high-speed computers and three-dimensional seismic recording systems. And, although development drilling in mature hydrocarbon provinces is accounting for approximately 80% of this year's wells, the high level of sophisticated seismic activity offers encouragement for wildcatting later on.

Petroleum Information Corp., in fact, reports a 23.9% increase in new field wildcats during the first quarter of 1981. Among the 2,044 completions were 189 oil field discoveries, a 36% increase over the same period in 1980, and 163 gas discoveries, 14 more than during last year's first quarter. PI also reports a 19% increase in exploratory drilling in or near existing fields.

70,000 Completions

In all, PI says that U.S. drilling this year is exceeding last year's record pace by almost 20%, and is likely to account for more than 70,000 completions. This is in line with guesses by other prognosticators, who are making open-ended predictions this year after having been outpaced by last year's 62,704 wells. The U.S. rotary rig count at the end of the first quarter of this year stood at 3,656 and was above 3,700 shortly thereafter.

The international active rig count, as shown in the accompanying table, also is on a high, with the total well above 5,000 active rigs as of March 31. Almost all

The Quarterly International Active Rig Report as prepared by Hughes Tool Co., Houston, Tex.

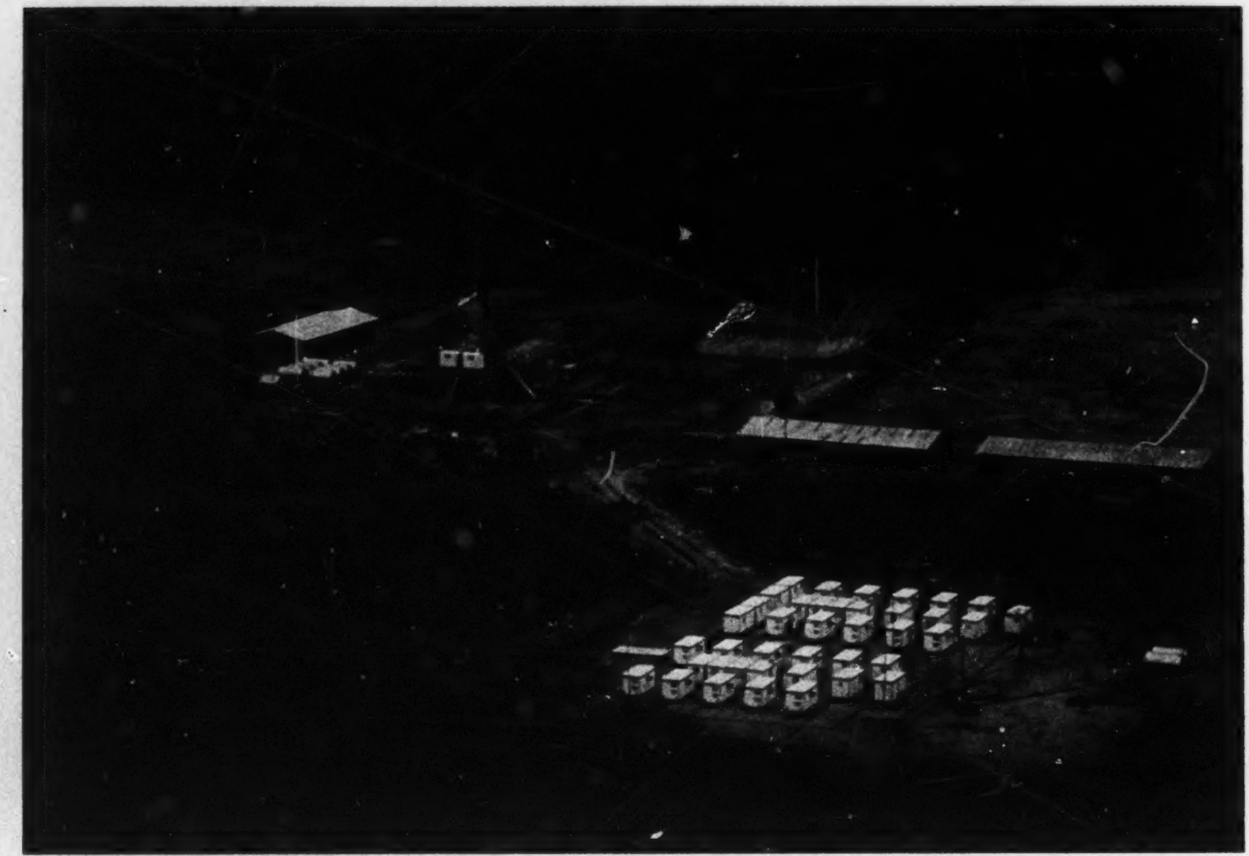
Country	Mar. '80	June '80	Sept. '80	Dec. '80	Mar. '81
South America, Central America and Mexico					
Argentina	73	72	76	82	78
Bolivia	4	4	4	4	11
Chile	6	6	7	8	6
Ecuador	3	3	3	3	3
Peru	19	20	22	22	22
Brazil	64	76	73	75	78
Venezuela	52	54	50	50	63
Colombia	12	14	10	21	21
Trinidad	13	14	12	12	14
Mexico	213	216	216	216	216
Central America	2	3	4	6	6
	461	482	477	499	518
Europe					
Austria	9	8	7	7	8
Denmark	2	3	3	2	2
France	11	11	11	18	17
Germany	21	23	22	22	24
Greece	2	3	3	3	6
Holland	18	20	17	14	15
Italy	19	16	16	25	32
Norway	11	11	11	11	12
Portugal					1
Spain	6	12	11	12	12
Switzerland	1	1	1	1	1
United Kingdom (North Sea)	43	50	50	50	58
Yugoslavia	22	22	22	22	22
	166	181	176	187	210
Africa					
Algeria	113	113	111	106	106
Angola	5	5	5	4	4
Cameroon	7	4	4	8	8
Congo	4	4	4	5	7
Gabon	9	9	9	6	12
Libya	45	40	40	40	33
Morocco	2	2	2	3	4
Chad	1	1	1	1	1
Nigeria	20	20	20	20	20
Tunisia	7	7	7	9	9
Niger	5	5	5	5	5
Ivory Coast	3	3	3	3	4
South Africa	2	2	2	2	2
Sudan	2	2	2	2	3
Zaire	1	1	1	1	1
	226	218	216	215	219
Middle East					
Abu Dhabi	21	24	24	24	28
Bahrain	1	1	1	1	1
Dubai	1	3	3	3	2
Egypt	24	27	27	27	22
Iraq	37	39	39	39	39
Kuwait	2	3	3	3	3
Oman	7	8	8	8	9
Qatar	7	8	8	8	8
Ras Al Khaimah	–	1	1	1	1
Saudi Arabia	24	25	25	25	29
Sharjah	–	1	1	1	2
Syria	16	15	15	15	16
Turkey	7	7	40	40	26
Umm Al Qaiwain					1
	147	162	195	195	187
Asia					
Bangladesh	2	2	4	5	5
Brunei	8	8	7	7	7
Burma	23	24	27	28	31
India	43	42	43	43	44
Indonesia	72	77	76	84	85
Japan	15	16	16	15	17
Malaysia	11	11	13	13	13
Pakistan	14	12	14	15	16
Philippines	17	13	9	10	11
Thailand	5	4	5	5	7
Taiwan	12	12	12	12	12
	224	223	227	237	248
Australia	12	17	19	14	14
New Zealand	2	1	1	4	4
Papua New Guinea	–	1	1	–	–
	14	19	21	18	18
Total free world except U.S. and Canada	**1,238**	**1,285**	**1,312**	**1,351**	**1,400**
North America					
Canada	400	418	387	343	251
U.S.	2,659	2,901	3,138	3,326	3,656
Totals	**4.297**	**4,604**	**4,837**	**5,020**	**5,307**

countries in the Free World are participating in this record level of activity, which has been climbing steadily ever since the Iranian revolution precipitated a sharp rise in oil prices a few years ago.

Only Canada seems to be bucking the international trend toward serious, all-out exploration, and it is the only country listed in the International Rig Report as having a significant decline in activity during the past year. Canada's troubles, however, have nothing to do with a lack of will on the part of the petroleum industry. They stem, rather, from a lack of appreciation by Ottawa of the seriousness of the energy situation.

The industry has turned up substantial new oil reserves off Canada's east coast and in the Beaufort Sea and High Arctic Islands area off the northwest coast recently, but development activities in these frontier areas are by no means a sure thing unless the industry can count on a stable political environment and freedom from additional confiscation of production by the federal government.

The Hibernia field offshore Newfoundland, for example, has been proven to be a substantial reservoir since its discovery in 1979, but Canada's tough new tax proposals could make the field uneconomic to develop. The physical environment at Hibernia is one of the most severe in the world. Not only are wave heights frequently in excess of 40 ft during the



Texaco and Amoco hit oil their first time at bat in the Peten area of northern Guatemala with this well, Xan No. 1. It struck 13.4° API gravity oil below 7,500 ft, and prompted the companies to fly in an additional rig.

winter, they are rarely less than 8 ft at any time of the year. The 100-year maximum design wave for the area is in the North Sea range of 100 ft.

But there's more. Icebergs represent not only a threat to production platforms in the area, but they also pose a threat to equipment and flow lines on the seafloor. So, production systems at Hibernia will have to be much more sophisticated, and costly, than they are in the North Sea.

Production will be difficult also in the Arctic Islands and the Beaufort Sea, where reserves are a long way from markets and transportation is likely to involve ice-breaking tankers.

Amazingly enough, however, although many Canadian drilling contractors have shown their displeasure with Ottawa by leaving the country altogether, petroleum companies still are spending big money to explore Canada's frontier areas. A Shell group, for example, has just announced a $200 million oil exploration program in water depths ranging from 2,900 to 8,900 ft off the coast of Nova Scotia. And, Mobil and Petro-Canada are continuing delineation and exploratory activity this year on the Labrador Shelf.

Veritable Hotbed

Latin America, on the other hand, is a veritable hotbed of exploration for oil and gas. Mexico says it will keep 223 drilling rigs active this year, which means that country could move ahead of Canada as the second busiest Free World driller before long. In nearby Guatemala, Texaco and Amoco have just struck oil in the first well drilled on a 487,000-acre contract area granted by the government in late 1978. The rig is being moved to another location nearby, and a second rig has been flown in to drill a third wildcat 12 miles away. The exploration is in the same geological province as that of Mexico's prolific Reforma and Chac fields 120 miles to the northwest.

Also in Guatemala, Getty Oil is continuing a wildcatting program in a jungle area about 90 miles northeast of Guatemala City.

In Panama, Sossa Petroleum is drilling a confirmation well on the Canazas dome in Darien Province, near Colombia. The first full-scale drilling operation in Panama's recent history, the program calls for a total of eight wildcats to be drilled in the country's eastern jungle region. Sossa holds exclusive rights to seven areas in Panama which are believed to contain 12 onshore and offshore structures.

Phillips Petroleum has completed seismic work in both the Cesar Basin and offshore Colombia, and is drilling its third land well this year. An offshore wildcat is planned for 1981 also.

In the Cocorna area of Colombia's Magdalena Valley, Texaco started a 20-well drilling program last year, and is planning a 456-well development program. The initial Cocorna production objective is to achieve 20,000 b/d of heavy oil by 1985, and to sustain or increase this production level over the next 28 years.

Venezuela's exploration activities are in high gear, with 370 wildcats scheduled to be drilled this year. As recently as 1976, the country could take credit for only 50 exploratory wells a year. Venezuela is also embarked on an ambitious project to evaluate the resources of the big Orinoco heavy oil belt that stretches for some 400 miles through eastern Venezuela. This will involve the drilling of some 600 additional wells by 1984.

Occidental Petroleum is continuing to explore the jungles of Peru, where production reached 109,000 b/d last year from 11 fields. Oxy also has defined a number of promising structures in nearby Bolivia on which drilling is to get underway this year.

Brazil is still very active offshore, where a seventh platform has just been commissioned for the Pampo area in the Campos Basin. A newer offshore area is located north of Brazil, in Central America, where Antigua recently granted an exploration license to Alladin Petroleum Corp. of Wichita, Kan. The area involved contains more than 5 million acres of territorial waters around the West Indies state and its dependencies, Barbuda and Redonda.

Offshore Waves

Argentina is causing waves offshore Tierra del Fuego, where both Shell and Exxon struck oil this year. The Shell well tested 5,000 b/d, and Exxon's was clocked at 3,100 b/d. Like wells offshore Canada, the new Argentine wells are a long way from production, but they lend credence to the belief in some quarters that the area between southern Argentina and the Falkland Islands contains as much oil as does the North Sea.

The third Ninian platform came on stream late last year in the UK sector of the North Sea, and average production from the field this year is expected to be 325,000 b/d. At the nearby Block 3/7 field, meanwhile, Chevron adapted onshore fracturing techniques to offshore use and tripled the production rate of an important appraisal well. Development of the field now appears to be economically attractive.

A few miles north of Ninian, Conoco is going ahead with plans to install the world's first operational drilling and production tension-leg platform at the Hutton field. Initial production at Hutton is scheduled for 1984. This puts Conoco on a similar schedule with Exxon, which has just announced plans to install the world's first guyed tower in Mississippi Canyon Block 280 of the Gulf of Mexico in time for production to also begin in 1984.

Phillips Petroleum, one of the pioneers of North Sea development with its Greater Ekofisk complex in the Norwegian sector, expects to begin its first crude production in the UK sector when the Maureen field comes on stream in 1982 or '83. The company also is actively exploring northwest of Maureen, in three discoveries known as the T-Block.

Oil Fever Spreads

Onshore, oil fever has spread to Northern Ireland where a petroleum exploration license has been issued to a consortium led by Ulster Natural Resources. The 455-sq-mile license area includes 85 sq miles of sea covering territorial waters out to the 3-mile limit offshore Antrim and Londonderry.

In Scotland, a group consisting of Dalco Petroleum, Delphi International, North Sea Petroleum, and Pacific Basin (UK) is exploring 59,000 acres in the area of Dunfermline, County Fife. Drilling depths there range from 500 to 700 ft, and indications, are that recoverable reserves in the area could be as much as 70 million bbl of oil.

Africa is beginning to lose its reputation as a sleeping giant among the world's oil provinces as exploratory activity picks up both offshore and on. A Phillips Group offshore the Republic of the Ivory Coast, for example, just completed testing a third confirmation well at rates ranging from 800 to 1,400 b/d of oil and 1 to 2.7 MMcfd of natural gas. Three drilling rigs are currently at work in the area, and an early production platform is to be installed next spring.

In the sprawling Sudan, Chevron has a new oil discovery for which early estimates of reserves indicate production of 10,000 b/d could last for 10 years. And that is not Chevron's first discovery on its 150,000-sq-mile acreage. The company's Unity field is due to come on stream next year at a rate of 15,000 b/d.

The Spanish oil firm Hispanoil will drill its first wildcat in Equatorial Guinea's territorial waters as soon as it can contract a drilling rig. With today's virtual 100% utilization rate for offshore rigs, the company does not realistically expect to begin drilling until late this year or early in 1982. Hispanoil has, however, completed a seismic survey off the Fernando Po coast.

Excitement in Sharjah

Amoco is generating excitement in Sharjah with its three Shajja wells. Early estimates are that the field could yield 80,000 b/d of condensate and 800 MMcfd of natural gas. The country's present production amounts to only 12,000 b/d of oil from the Mubarak offshore field. The Shajja wells are onshore.

Mobil and the French company Total struck oil earlier this year offshore Cameroon. The find is not believed to be commercial, but it is the first oil discovery in the area, which is 10 miles offshore Kribi. Appraisal wells, therefore, are in the works.

Australia is continuing its comeback as an active drilling province, with active rigs having tripled there since a pro-business government was elected to power in 1975. The big splash in that part of the world these days, however, is Conoco's oil discovery in Irian Jaya. The well, located 130 miles from the nearest oil production, flowed at a stabilized rate of 6,000 b/d of 39° API gravity oil, with no natural gas or water. The well, drilled in jungle-covered lowlands near the coast of Irian Jaya (the western half of New Guinea), struck pay dirt at the top of the Kais Carbonate formation, at a depth of about 1,530 ft. ■

"Big Oil" Takes it on the Chin

by Greg Martin, *Editor, ENERGY NEWS/ENERGY WEEK*

First quarter earnings of 62 oil companies plunged 13.6% from first quarter of 1980, dragged down by heavy losses in the refining sector of integrated companies. Income continued to rise for independent producers, boosted by the final increment of U.S. crude oil decontrol on Jan. 28. The profit margin for the entire group fell from 6.9% to 5.2%.

"Big Oil" took it on the chin as refiners were forced to cut prices to try to get rid of bulging product inventories. In the weakening market for gasoline, refiners couldn't raise prices enough to recoup rising costs of crude oil.

Some refiners found themselves buying OPEC crude for $4/bbl more than the selling price of refined product yields. Those without oil/gas production, like Ashland, Clark Oil and Tosco, suffered most.

Income declines, of course, were relative to record earnings in first quarter 1980. Majors like Standard Indiana, Gulf and Conoco saw big refining/marketing profits in that quarter turn to big losses in 1981's first quarter.

Texaco shook a 10% earnings gain out of inventories. It needs less product to supply its customers after closing part of its retail markets. Standard Ohio's gain was due to higher prices for Alaskan crude oil; Standard California credited higher prices for crude and natural gas.

"A free market does not quickly absorb sudden cost increases when demand is weak," said Robert Anderson, chairman, Atlantic Richfield. W. C. Douce, head of Phillips, noted: "The recent decline in the price of gasoline is evidence of the vigorous competition that is taking place."

Majors also had to pay sharply higher "windfall profits" tax (WPT) compared to first quarter 1980, when the tax was in effect only one

(Continued on page 8)

FIRST QUARTER GAS COMPANIES FINANCIAL REPORTS

	Three months ending March 31**							
	Revenues ($000)			Earnings* ($000)			Profit Margin‡	
	1981	1980	% Chg.	1981	1980	% Chg.	1981	1980
Alabama Tennessee N.G.	34,064	26,778	+ 27.2	1,638	1,324	+ 23.7	4.8	4.9
American Nat. Resources	1,124,220	976,333	+ 15.1	61,254	54,160	+ 13.1	5.4	5.5
Arkansas Louisiana Gas	339,659	286,312	+ 18.6	34,432	35,898	- 4.1	10.1	12.5
Columbia Gas	1,439,821	1,302,382	+ 10.6	83,394	82,478	+ 1.1	5.8	6.3
Commonwealth Nat. Res.	76,846	70,207	+ 9.5	2,975	3,124	- 4.8	3.9	4.4
Consolidated Nat. Gas	1,043,042	953,206	+ 9.4	71,218	70,003	+ 1.7	6.8	7.3
ENSERCH Corp.	834,842	694,687	+ 20.2	58,354	45,290	+ 28.8	7.0	6.5
Equitable Gas	160,327	125,326	+ 27.9	20,660	16,680	+ 23.9	12.9	13.3
Houston N.G.[1]	719,477	586,632	+ 22.7	61,807	49,295	+ 25.4	8.6	8.4
InterNorth	1,142,615	938,396	+ 21.8	116,957	111,114	+ 5.3	10.2	11.8
Mountain Fuel Supply	146,557	129,025	+ 13.6	14,575	14,950	- 2.5	9.9	11.6
ONEOK Inc.	333,877	280,206	+ 19.2	21,239	20,929	+ 1.5	6.4	7.5
Peoples Energy	1,234,686	1,075,862	+ 14.8	88,770	66,242	+ 34.0	7.2	6.2
Pioneer Corp.	288,155	210,483	+ 36.9	29,198	23,430	+ 24.6	10.1	11.1
Southern Nat. Resources	678,054	553,782	+ 22.4	47,348	37,050	+ 27.8	7.0	6.7
Texas Eastern Corp.	1,154,547	1,086,711	+ 6.2	62,608	61,258	+ 2.2	5.4	5.6
Texas Gas Transmission	683,164	585,333	+ 16.7	31,628	25,073	+ 26.1	4.6	4.3
TransCanada PipeLines	961,533	782,892	+ 22.8	25,955	22,050	+ 17.7	2.7	2.8
Transco Companies	865,190	586,235	+ 47.6	31,386	28,357	+ 10.7	3.6	4.8
Union Gas Ltd.	315,794	260,352	+ 21.3	16,532	15,485	+ 6.8	5.2	5.9
United Energy Resources	1,264,076	1,034,782	+ 22.2	55,404	41,702	+ 32.9	4.4	4.0
Westcoast Transmission	371,903	436,986	- 14.9	15,927	11,920	+ 33.6	4.3	2.7
TOTAL	15,212,449	12,982,098	+ 17.2	953,259	837,812	+ 13.8	6.3	6.5

*Earnings available to common. **Excluding non-recurring items. ‡Earnings* divided by Revenues.

[1] Three months ending January 31.

FIRST QUARTER OIL COMPANIES FINANCIAL REPORTS

		Three months ending March 31**							
		Revenues ($000)			Earnings* ($000)			Profit Margin‡	
		1981	1980	% Chg.	1981	1980	% Chg.	1981	1980
1.	Adobe Oil	39,305	39,221	+ 0.2	5,156	5,068	+ 1.7	13.1	12.9
2.	Alaska Interstate	91,278	56,735	+ 60.9	17,946	14,221	+ 26.2	19.7	25.1
3.	Amerada Hess	2,969,215	2,325,398	+ 27.7	174,536	198,978	- 12.3	5.9	8.6
4.	American Petrofina	666,473	523,374	+ 27.3	20,250	31,410	- 35.5	3.0	6.0
5.	American Quasar	13,716	10,085	+ 36.0	650	2,242	- 71.0	4.7	22.2
6.	Arapaho Petroleum[1]	14,401	5,517	+161.0	112	142	- 21.1	2.6	4.5
7.	Argo Petroleum	4,160	3,229	+ 28.8	645	474	+ 36.1	15.5	14.7
8.	Ashland Oil	2,153,998	2,040,159	+ 5.6	715	42,262	- 98.3	0.03	2.1
9.	Atlantic Richfield	7,132,320	5,461,176	+ 30.6	346,484	427,017	- 18.9	4.9	7.8
10.	Belco Petroleum	232,684	211,543	+ 10.0	26,246	18,243	+ 43.9	11.3	8.6
11.	Buttes Gas & Oil	37,630	40,217	- 6.4	2,943	3,186	- 7.6	7.8	7.9
12.	Callon Petroleum[1]	2,123	1,578	+ 34.5	238	384	- 38.0	11.2	24.3
13.	Clark Oil & Refining	403,708	402,274	+ 7.1	(4,469)	14,100			3.5
14.	Commonwealth Oil Ref.	304,569	306,243	- 0.5	(22,348)	(6,700)			
15.	Consolidated O&G	11,537	8,141	+ 29.4	1,982	94	+2008.5	17.2	1.2
16.	Conoco	5,396,200	4,300,000	+ 24.6	250,900	328,600	- 23.6	4.6	7.6
17.	Crown Central Petr.	379,080	306,230	+ 23.8	(10,228)	11,478			3.7
18.	Crystal Oil	75,874	58,321	+ 30.1	(1,573)	2,887			5.0
19.	Delhi Int'l Oil	7,919	5,596	+ 41.5	1,181	981	+ 20.4	14.9	17.5
20.	Diamond Shamrock	864,968	755,331	+ 14.5	48,037	56,255	- 14.6	5.6	7.4
21.	Discovery Oil	1,379	446	+209.2	102	(14)		7.4	
22.	Dorchester Gas[1]	151,874	174,778	- 13.1	6,631	7,583	- 12.6	4.4	4.3
23.	Dyco Petroleum	10,579	6,396	+ 65.4	2,956	1,610	+ 83.6	27.9	25.2
24.	Exxon	30,323,000	27,654,000	+ 9.7	1,600,000	1,925,000	- 16.9	5.3	7.0
25.	Felmont	19,047	11,948	+ 59.4	4,952	3,749	+ 32.1	26.0	31.4
26.	Forest	31,094	21,464	+ 44.9	2,282	2,123	+ 7.5	7.0	10.0
27.	Getty Oil	3,294,621	2,268,699	+ 45.2	229,930	225,548	+ 1.9	7.0	9.9
28.	Gulf Oil Corp.	7,874,000	7,753,000	+ 1.6	303,000	389,000	- 22.1	3.8	5.0
29.	Howell Petroleum	22,179	4,381	+406.3	1,924	862	+123.2	8.7	19.7
30.	Inexco Oil	52,898	31,720	+ 66.8	6,345	5,747	+ 10.4	12.0	18.1
31.	Kerr-McGee Corp.	916,126	780,394	+ 17.4	43,337	47,142	- 8.1	4.7	6.0
32.	Louisiana L&E	322,802	264,954	+ 21.8	50,562	51,593	- 2.0	15.7	19.5
33.	Mapco Inc.	580,021	378,811	+ 53.1	25,435	31,296	- 18.7	4.4	8.3
34.	Marathon Oil	2,424,098	2,265,368	+ 7.0	69,775	139,071	- 49.8	2.9	6.1
35.	McFarland Energy	3,985	3,389	+ 17.6	1,175	1,065	+ 10.3	29.5	31.4
36.	Mesa Petroleum	103,624	106,930	- 3.1	29,841	19,913	+ 49.9	28.8	18.6
37.	Mobil Corp.	17,095,000	15,278,000	+ 11.9	640,000	846,000	- 24.3	3.7	5.5
38.	Murphy Oil	666,806	569,245	+ 17.1	38,430	28,390	+ 35.4	5.8	5.0
39.	Natomas	369,348	294,214	+ 25.5	58,237	48,015	+ 21.3	15.8	16.3
40.	Noble Affiliates	87,503	67,584	+ 29.5	10,850	13,459	+ 34.1	20.6	19.9
41.	Occidental Petroleum	3,379,600	3,346,600	+ 10.0	259,400	277,900	- 6.7	7.7	8.3
42.	Pacific Resources	231,382	206,960	+ 11.8	(1,380)	9,030			4.4
43.	Patrick Petroleum[2]	18,634	12,376	+ 50.6	1,304	574	+127.2	7.0	4.6
44.	Pennzoil Co.	687,988	612,905	+ 12.3	59,123	82,501	- 28.3	8.6	13.5
45.	Phillips Petroleum	4,228,469	3,384,162	+ 24.9	270,784	284,414	- 4.8	6.4	8.4
46.	Quaker State	218,157	194,860	+ 12.0	3,636	6,879	- 47.1	1.7	3.5
47.	Shell Oil	5,413,000	4,798,000	+ 12.8	361,000	373,000	- 3.2	6.7	7.8
48.	Southland Royalty	95,680	90,635	+ 5.6	10,248	18,800	- 45.5	10.7	20.7
49.	Standard California	11,988,000	10,447,000	+ 14.8	660,000	627,000	+ 5.3	5.5	6.0
50.	Standard Indiana	7,853,100	6,450,900	+ 21.7	376,700	576,000	- 34.6	4.8	8.9
51.	Standard Ohio	3,119,300	2,658,700	+ 17.3	520,400	450,700	+ 15.5	16.7	17.0
52.	Statex Petroleum	2,504	1,243	+101.4	589	186	+216.7	23.5	15.0
53.	Sun Co.	4,000,000	3,100,000	+ 29.0	120,000	251,000	- 52.2	3.0	8.1
54.	Superior Oil	492,906	330,287	+ 49.2	107,960	90,566	+ 19.2	21.9	27.4
55.	Tenneco	3,809,000	3,316,000	+ 14.9	194,000	178,000	+ 9.0	5.1	5.4
56.	Tesoro	841,574	823,265	+ 2.2	23,273	36,155	- 35.6	2.8	4.4
57.	Texaco Inc.	15,453,000	13,248,900	+ 16.6	658,000	600,600	+ 9.6	4.3	4.5
58.	Texas Oil & Gas	389,659	294,901	+ 32.1	47,874	34,783	+ 37.6	12.3	11.8
59.	Tosco Corp.	762,429	534,162	+ 42.7	(38,688)	22,629			4.2
60.	Tribune Oil	563	472	+ 19.3	164	191	- 14.1	29.1	40.5
61.	Union California	2,666,458	2,375,612	+ 12.2	154,479	152,922	+ 1.0	5.8	6.4
62.	Woods Petroleum	16,377	11,968	+ 36.8	4,667	3,065	+ 52.3	28.5	25.6
	TOTAL	150,818,922	131,035,997	+ 15.1	7,785,900	9,015,369	- 13.6	5.2	6.9

*Earnings available to common. **Excluding non-recurring items. () Loss. ‡Earnings* divided by revenues. [1]Ends February 28, 1981 and February 29, 1980. [2]Third quarter ends January 31, 1981.

month. Standard California said its $377 million WPT payments were higher than for all of 1980.

Other WPT totals: Exxon, $584 million; Standard Indiana, $532.4 million; Atlantic Richfield, $449 million; Shell, $387 million; Gulf, $327 million; Texaco, $319.2 million; Mobil, $249 million; Union California, $139.5 million.

In times of controlled prices, the lost margins of profit could be "banked" for later recovery. Now, refiners must find a way out.

Nonetheless, refiners' outlook for the rest of 1981 is not that bleak. Standard Indiana, Union California and Conoco still expect improvement over 1980, as refiners absorb major capital expenditures for refinery modifications and the full impact of oil price decontrol.

Clark Oil says consumer resistance to higher product prices is putting pressure on crude oil producers to lower prices. "We expect some degree of price improvement for the balance of 1981, and further margin improvements will be realized." Tosco expects "further strengthening over the rest of the year." Pacific Resources anticipates "a strong second half as product prices and markets strengthen."

Independent producers will show big earnings gains this year—but they'll also be saddled with big WPT payments.

Gas company results were mixed. Net income for the group as a whole rose 13.8% over first quarter 1980, but revenue gains outstripped earnings as rising costs of natural gas were passed through to end users. The group's profit margin dipped from 6.5% to 6.3%.

As in 1980, gas companies derived an increasing share of earnings from nonregulated operations — oil/gas exploration and production, gas processing, contract drilling.

Exploration/production earnings for InterNorth rose 167% over previous year's first quarter. Tax credits from InterNorth's investment in Northern Border Pipeline project also helped.

Impetus behind ENSERCH's record first quarter earnings came from exploration/production and oilfield services segments, as gas transmission and distribution income fell. Nonutility business also was the main factor in ONEOK's increased earnings.

Contract drilling operations were largely responsible for Peoples Energy Corp.'s income gain, offset by weak industrial gas markets and higher operating and financing costs.

Columbia Gas benefited from "increased sales of oil, gas, propane and other hydrocarbons." Income would have been greater except for reduced industrial gas sales and loss of equity earnings on the LNG facility at Cove Point, MD.

Mountain Fuel Supply's utility operations had lower income, but oil/gas earnings were sharply higher due to decontrol.

All segments of Southern Natural Resources showed big earnings gains: Gas pipeline operations up 25%, exploration/production up 71%, contract drilling up 121%.

All units of United Energy Resources contributed to record first quarter earnings. United's pipeline system had its lowest level of gas curtailments in recent history. ■

Lithographic Prints in LIMITED EDITIONS of Original Drawings

***by* ANTHONY BRANDT**

ECSTASY (F) **53 x 101 cm: 21 x 40 ins.**

1st EDITIONS Limited to 75 proofs numbered and signed by the Artist
2nd EDITIONS Limited to 500 proofs similarly signed and numbered
3rd EDITIONS Limited to 10,000 proofs numbered but not signed

PRINT F		PRINT M	
SOLD	OUT	£70	$170
£60	$150	£40	$ 95
£30	$ 75	£20	$ 50

Printed under the personal supervision of ANTHONY BRANDT himself on the same superlative heavy papers upon which the originals are drawn, these proofs are virtually indistinguishable from the original drawings, "Ecstasy" being printed in black and white on olive green paper and "Crossed Legs" in sepia and white on sage green paper. Justly recognized as being one of the World's leading exponents of the Nude in Art today, Anthony Brandt who has been acclaimed in the Press and on TV as

"BRITAIN'S MODERN MICHELANGELO"

draws in a classical style that will not date. These Lithographic Prints have won the acclaim on several occasions of leading Financial Journals not only for their very

REAL INVESTMENT POTENTIAL

but also for the superlative quality of the figure drawing displayed therein. They should thus make an immediate appeal both to Connoisseurs of Art and to Investors. Trade enquiries from Fine Art Dealers are welcomed.
Cheques and International Money orders should be made payable to Renaissance Fine Arts, Ltd. Please add for postage and packing: by Sea Mail £2 : $ 5
or by Air Mail £5 : $12

BY POST
RENAISSANCE FINE ARTS LTD.
73 NEW BOND ST. LONDON W.1.

CROSSED LEGS (M) 58 x 33 cm: 23 x 17 ins.

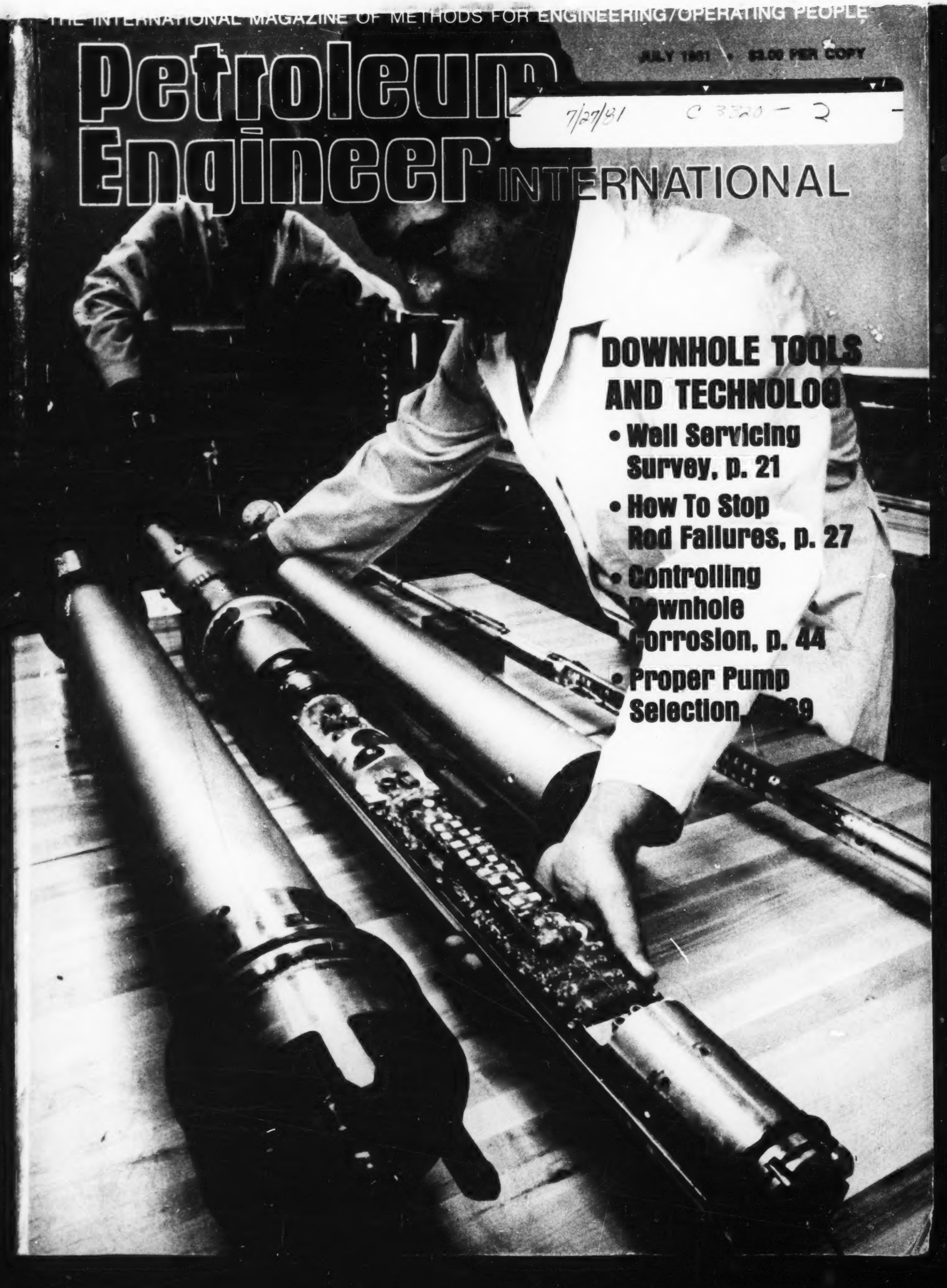
Circle 5 on Reader Service Card

THE INTERNATIONAL MAGAZINE OF METHODS FOR ENGINEERING/OPERATING PEOPLE

Petroleum Engineer INTERNATIONAL

JULY 1981 • $3.00 PER COPY

7/27/81 C 3320 - 2



DOWNHOLE TOOLS AND TECHNOLOG

- Well Servicing Survey, p. 21
- How To Stop Rod Failures, p. 27
- Controlling Downhole Corrosion, p. 44
- Proper Pump Selection, [illegible]9

Springtime Slump Prolonged In Canada

U.S. drillers are still setting records each week, while their Canadian counterparts are showing signs of coming only part of the way back from the annual springtime slump which reached its low point this year on May 4 when only 147 rigs were reported to be turning north of the border. A month later, the Canadian count was almost 100 rigs higher, but it still was almost 200 rigs short of where it was at the same time last year. Canadian drillers in 1980 practically ignored the spring thaw altogether in compiling their best record ever. This year, the slump has taken its toll.

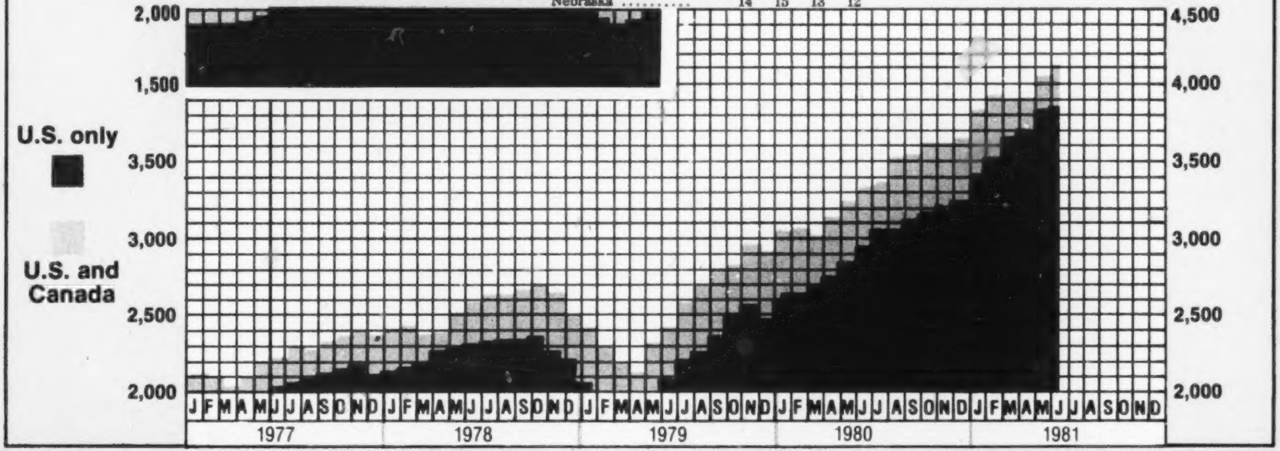
The average weekly rig count in Canada this year stood at 420 on March 9. Just 13 weeks later, on June 8, the weekly average had dropped to 304.

What the situation on both sides of the border adds up to is a classic example of the effects of governmental activities.

Rotary Rigs Actually Making Hole In United States & Canada

As Reported to International Association of Drilling Contractors by Hughes Tool Co.

	May 18, 1981	May 26, 1981	June 1, 1981	June 8, 1981
Alabama				
Offshore	3	3	3	3
Land	17	18	10	12
Alaska				
Land	22	20	21	22
Offshore	2	2	4	4
Total	24	22	25	26
Arkansas	32	33	33	34
Arizona	1	2	2	2
California				
Land	132	130	132	130
Offshore	20	20	20	20
Total	152	150	152	150
Colorado	68	72	73	79
Florida				
Land	6	6	6	6
Offshore	3	3	3	3
Total	9	9	9	9
Georgia	1	1	1	1
Hawaii	1	1	1	1
Idaho	3	3	3	3
Illinois	27	27	28	25
Kansas	198	192	191	193
Kentucky	0	1	1	0
North Louisiana	54	57	61	62
South Louisiana				
Inland Waters	84	81	75	83
Land	152	143	143	150
Offshore	145	142	138	146
Total	435	423	417	441
Maryland	1	1	1	1
Michigan	40	40	51	42
Mississippi	71	64	69	72
Montana	80	70	72	74
Nebraska	14	15	13	12
Nevada	7	6	6	6
New Mexico	135	130	135	126
New York	7	7	8	11
North Dakota	118	125	126	119
Ohio	99	103	105	111
Oklahoma	648	655	669	664
Oregon	1	1	2	2
Pennsylvania	35	35	34	32
Rhode Island	1	1	1	1
South Dakota	2	2	2	2
Texas				
Offshore	71	71	68	72
Dist. 1	74	77	73	72
Dist. 2	76	74	79	69
Dist. 3	246	247	241	229
Dist. 4	117	119	116	116
Dist. 5 & 6	157	163	162	169
Dist. 7B	92	90	86	91
Dist. 7C	97	93	91	86
Dist. 8	150	162	164	157
Dist. 8A	85	82	86	84
Dist. 9	81	84	85	87
Dist. 10	63	68	67	63
Total	1309	1330	1318	1296
Utah	76	68	69	77
Virgina	2	3	3	3
Washington	1	1	1	1
West Virginia	38	42	40	41
Wyoming	182	186	184	189
Total U.S.	3828	3842	3858	3860
Western Canada	161	200	218	237
Eastern Canada	3	3	3	4
U.S. and Canada	3992	4045	4079	4101



PETROLEUM ENGINEER INTERNATIONAL • 800 Davis Building • Dallas, Texas 75202 • **TWX** 910-861-9306

Abbott Sparks President
John G. Grant Publisher and Vice President
W. B. Bleakley Editor
Richard D. McNally Associate Editor
Steven D. Moore Technical Editor
Mary Jane Ellis Assistant Editor
Laura Jacobus Assistant Editor
Edna Taylor Editorial Assistant
J. E. (Hank) Kastrop Consulting Editor
Renn Rothrock, Jr. Consulting Editor
Ernestine Adams Editor, Energy Management Rpt.
Gregory Martin Editor, Energy News/Energy Week
Sharon Hutcheson Editorial Assistant

•

Brenda Hyde Promotion
Alan Hilton Service R&D Manager
Denise Tevis Service R&D Department
Olga Dunn Reader Service

ADVERTISING SALES OFFICES

EASTERN: Richard Martin, P. O. Box 89, Tennent, New Jersey 07763, (201) 446-3230

CHICAGO 60646: Dwain Holmgren 4761 West Touhy Ave., Lincolnwood, Illinois (312) 679-1100

OHIO, WESTERN PA.: Dwain Holmgren, 4761 West Touhy Avenue, Lincolnwood, Illinois (312) 679-1100

LOS ANGELES 91106: Bruce Berkey, 61 S. Lake Ave., Box 4566, Pasadena, Calif., (213) 681-0685

HOUSTON 77027: Jess Adkins, Vice Pres., Gulf Coast Regional Manager, **Barry Biklen, Hal Odum,** 4151 Southwest Freeway Suite 115, (713) 626-7850

DALLAS 75202: Ed Sealey, George Galloway, 800 Davis Bldg., (214) 748-4403, TWX 910-861-9306

WEST TEXAS: Rusty Meador, P. O. Box 611, Eldorado, Texas 76936 (915) 853-2689

UNITED KINGDOM, NETHERLANDS, SCANDINAVIA: Bryan Clark, Energy Publications Div. HBJ, 24/28 Oval Road, London NW1 7DX, England, (01) 485-7074 (OR 7075). Cable: HARBREX London NW1: Telex: 25775

FRANCE, ITALY, BELGIUM, SWITZERLAND: Gerard Lasfargues, 32, rue Desbordes Valmore, 75016-Paris, France, Telephone: 504 97 94

JAPAN: Mashy Yoshikawa, Orient Echo, Inc., 11th Floor Sankyo Bldg., 7-12 Tsukiji 2-chome, Chuo-ku, Tokyo, Telephone: 541-4923, Cable: MYORIENTECHO

GERMANY, AUSTRIA: S.I.P.A.S., **Wim. J. M. Sanders, Paul J. Verbunt,** Raadhuisstraat 24, P. O. Box 25, 1484 EN Graft-de Ryp, Holland, Telephone 02997-1303 and 3660. Telex: 13039 sipas nl, Telegrams: SIPAS-Amsterdam

Jane Dietz Production Department Manager
Don Fickert Graphics Director
Janell Fowler Production Manager
Debbie Cooper Production Coordinator
Dennis Howard Presentation
Laura Page Presentation
James Duke Presentation
Victoria Valentin Presentation

•

Gary Hogan Business Manager
Jack Schabel Circulation Director
Royal Courtney Circulation Fulfillment Manager

ENERGY PUBLICATIONS
• a Division of Harcourt Brace Jovanovich •
P.O. BOX 1589 • 800 DAVIS BUILDING
DALLAS, TEXAS 75221 • (214) 748-4403

PETROLEUM ENGINEER INTERNATIONAL
Pipeline & Gas Journal
Energy Management Report
Energy News • Energy Week

HBJ A HARCOURT BRACE JOVANOVICH PUBLICATION ABP ABC

EDITORIAL ADVISORY COMMITTEE
Lloyd E. Elkins, Petroleum Consultant
Bennie L. Franks, President, Sun Texas Co.
Dennis E. O'Brien, Technology Section Head, Exxon Chemical Company
B. R. Jones, President, Eagle Production and Drilling Co.
Frank Schuh, Director of Engineering Development, ARCO Oil and Gas Co., a Division of Atlantic Richfield Co.
Marius J. Mes, Senior Research Scientist, Production Research Department, Conoco Inc.

PETROLEUM ENGINEER INTERNATIONAL (USPS 429-380) published 15 times each year, monthly plus March 15, July 15 and November 15, by Energy Publications Division, Harcourt Brace Jovanovich, P. O. Box 1589, Dallas, Texas 75221.

July, 1981, Volume 53, No. 8. Copyright © 1981 by Harcourt Brace Jovanovich, Inc. All rights reserved. No part of this publication may be transmitted or reproduced in any form or by any means, electronic or mechanical, including photocopy, recording, or any information storage and retrieval system, without permission in writing from the publisher.

Subscription rate to personnel employed by companies involved with exploration, drilling, production, or field processing of oil or gas: one year $12.00, two years $18.00, three years $24.00 for North, Central, and South America. Outside North, Central, and South America: one year $25.00, two years $35.00, three years $45.00. Subscription rate for all others: $25.00 for one year. Single copy price $3.00. Second class postage paid at Duluth, MN and additional mailing offices.

Microfilm copies are available through University Microfilms, Inc., 313 North First Street, Ann Arbor, Michigan. Indexed by Applied Science, Technology Index and the Engineering Index, Inc.

Postmaster: Send address changes to PETROLEUM ENGINEER INTERNATIONAL, P.O. Box 1589, Dallas, Texas 75221, USA.

HARCOURT BRACE JOVANOVICH PUBLICATIONS
ROBERT L. EDGELL, Chairman; RICHARD MOELLER, President; LARS FLADMARK, Executive Vice President; ARLAND HIRMAN, Treasurer; JOE BILDERBACH, Vice President; JAMES GHERNA, Vice President; GEORGE GLENN, Vice President; THOMAS GRENEY, Vice President; EZRA PINCUS, Vice President; HARRY RAMALEY, Vice President; ABBOTT SPARKS, Vice President. OFFICES: 757 Third Avenue, New York, N.Y. 10017. Phone (212) 888-4444; 1 East First Street, Duluth, Minnesota 55802. Phone (218) 727-8511. 111 East Wacker Drive, Suite 1730, Chicago, Ill. 60601. Phone (312) 938-2300.

ABOUT THE COVER: Technician checks out downhole instrument package for measurement-while-drilling system designed to save rig time and improve drilling accuracy. (Photo courtesy of Eastman Whipstock.)

NEXT MONTH: New methods and technology being applied to maximize recovery of oil and gas will be the subject of the Production Technology Report in August.

Petroleum Engineer® INTERNATIONAL

The international magazine of methods for engineering/operating people

JULY 1981 NUMBER 8 VOLUME 53

DOWNHOLE TOOLS AND TECHNOLOGY

Well Servicing Boom Pushes Costs Over $3 Billion 21
by Steven D. Moore, Technical Editor

Stop Sucker Rod Failures To Save Money 27
by Keith H. Moore, Dover Corp./Norris Division

Continuous Injection Method Controls Downhole Corrosion—Part 1 44
by J.B. Bradburn and R. B. Todd, Tenneco Oil Co.

Gas Calculations Aid Submersible Pump Selections 69
by Joe Vandevier, John Bearden, and John Beavers, Centrilift-Hughes

Modern Production Risers—Part 9 88
by Larry Krolikowski, Exxon Production Research Co.

Conquering Alaska's Arctic Drilling Problems—Part 3 96
by Steven D. Moore, Technical Editor

Calculating Deep Water Moorings At High Loads 104
by Marius J. Mes, Conoco Inc.

Designing World's Largest Seawater Injection System 122
by John B. Morrison and Monica A. Jorque, Bechtel Petroleum Inc.

New Downhole Steam Generator Tested 136
Staff Report

How Plunger Lift Affects Production 143
by Ernest M. Beauregard and Paul L. Ferguson, Ferguson Beauregard Inc.

Mud Pump Failure Analysis—Part 1 162
by Edwin C. Lewis II, Innovative Concepts

EDITORIAL DEPARTMENTS

News Hi-lites 1
Significant Happenings in Petroleum

Course of Oil 6
The Change Is Here

Technology Trends 8
Forecasts from Current Events

Offshore Technology 10
DSDP Re-entry

Continuous Tables 181

Drilling/Exploration 184
U.S. Gas Reserve Estimates

Industry Meeting Calendar 198

Company News 201

Petroleum Profiles 206
Five Minutes with Hunter Sheridan

Professional Directory 214

Index to Advertisers EM 12

ENERGY *management report*™

by Ernestine Adams

Comment EM 1
Energy World Report EM 2
Financial Notebook EM 3
Oil & Gas Professional Opportunities EM 5

International Report

The International Energy Agency and the Organization for Economic Cooperation and Development report that crude oil production in the OECD area increased 1.1% in 1980 to 702.2 million tons (about 5.1 billion bbl). Consumption was down 7%.

OECD net oil imports dropped 12.6% during 1980 to 1,143.7 million tons (about 8.3 billion bbl). Norway and the UK increased their production in 1980 by 28 and 3.3%, respectively.

Stocks of crude oil and products in the OECD area at the end of last year totaled 462.8 million tons (3.3 billion bbl), compared with 443.9 million tons (3.2 billion bbl) at the end of 1979.

In what is believed to be the first exploration and development agreement between China and a U.S. oil company, Arco International Oil & Gas Co. and Santa Fe International Corp. plan to develop a 3,500-sq-mile section of the Ying Ge Hai Basin in the South China Sea. The companies have conducted seismic tests of the region, and exploratory drilling is scheduled to begin later this year.

Terms of the production-sharing agreement reportedly are similar to Indonesian contracts in which the country takes 85% of production.

Currently there are only two other exploration arrangements between the Chinese and foreign companies. One is with the French company Total for exploration of the Gulf of Tonkin and the South China Sea, and the other is with a Japanese group for exploration of Pohai Bay.

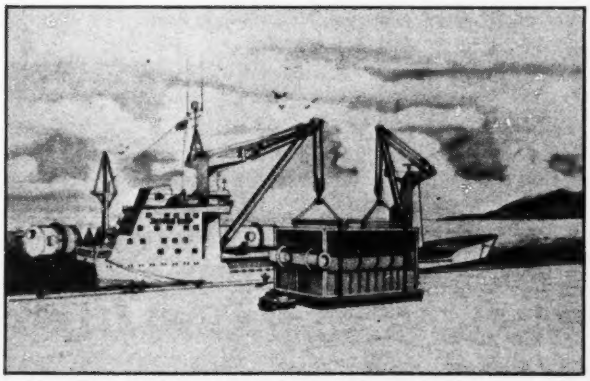
Drilling in Pohai Bay already has turned up an oil find, in Japan National Oil's No. 1 well. The oil reportedly is light, low in wax content, and ideal for Japanese refineries that are designed to process Arabian light grades, not the heavy, waxy oil supplied to Japan from such Chinese onshore fields as Daqing.

Japan National Oil Corp. is scheduled to drill five wells in Pohai Bay this year, and some unofficial Japanese estimates put reserves there as high as 75 billion bbl. Others believe, however, that Pohai Bay's oil is scattered in rich but small pockets, and that earthquakes in the region have disrupted oil-bearing strata, making the oil hard to tap.

Two super-heavy-lift module carriers are under construction by the Dutch shipbuilding company Yssel-Vliet Combinatie. The fourth generation of Jumbo heavy-lift carriers, the two vessels will be much bigger and heavier than those of preceding generations.

Being built for Khan Heavy Lift BV and Fairplay Scheepvaart BV, the ships will be able to load and discharge pieces up to 1,000 tons. To achieve this, each ship will be equipped with two derricks capable of lifting 500 tons apiece. The derricks are to be unconventionally positioned, with the aft derrick entirely on the starboard and the forward derrick entirely on portside. This allows for an extra-long hatch and substantial free deckspace, thereby permitting transport of pieces longer than 300 ft and wider than 60 ft.

The first of the new ships is to be delivered by the end of 1982, and the second by the middle of 1983.



A feature of the new ships will be a superstructure that occupies only a small space aft, on starboard only, creating a level and clear deck, much like an aircraft carrier.

A survey by Norway's Ministry of Petroleum and Energy indicates that the proven recoverable reserves of gas on the Norwegian continental shelf south of the 62nd parallel amount to almost 46 trillion cubic feet (tcf). The value of the gas is normally put at $6.35/Mcf, which means that the value of the reserves proven so far is approximately (U.S.) $300 billion.

Proven gas fields on the Norwegian shelf south of the 62nd parallel.

Field	Gas reserves billion cu ft
Ekofisk	3,920
Albuskjel	812
Cod	282
Edda	212
Eldfisk	1,836
Tor	635
Frigg	4,485
Northeast Frigg	494
Odin	777
Statfjord	1,412
Valhall	989
West Ekofisk	989
Heimdal	1,271
Hod	318
Sleipner	5,120
Valhall B	847
Block 1/9-A	388
Block 1/9-G	459
Block 15/3	2,225
Block 25/2	424
Block 30/6 (the silver block)	2,119
Block 30/7	882
Block 31/2 (estimated)	14,125
Block 31/6	28,251
Block 34/10 (gold block-D)	247
Block 34/10 (gold block-A)	141
Total	**73,660**

Total value of gas reserves on Norwegian shelf, however, may be in the region of $701 billion. The Ministry of Petroleum and Energy has, in fact, calculated that the gas reserves in one area alone (sector 31, west of Bergen) may be between 64 and 67 tcf.

The Petroleum Directorate in Stavanger operates with figures for probable oil and gas reserves south of the 62nd parallel of approximately 34 billion bbl of oil equivalent. Gas probably constitutes about 54% of this, which means that there are about 85 tcf of gas in the area south of the island of Stad (outside Bergen) alone. This constitutes about 15% of the Norwegian continental shelf.

If the Norwegian Storting (Parliament) goes along with the government's plans to pipe gas ashore from Statfjord, Heimdal, and the gold block (34/10), therefore, Norway will, towards the late 1980s, emerge as a nation that is not only rich in oil, but in gas as well.

The Norwegian Information Council reports that the government wants to pipe Norwegian gas ashore at Karsto, north of Stavanger. Up to now, wet gas has been used as a petrochemical feedstock in Norway and dry gas has been exported to the Continent through the pipeline from Ekofisk to Emden in West Germany.

Another possibility is that gas will be found offshore northern Norway, which could lead to establishment of a petrochemical industry in that area. The state oil company, Statoil, already has begun a $27 million research project into this possibility. Although there is no market at present for large quantities of gas off northern Norway, it is generally agreed that a market will emerge in the not-too-distant future.

Hakon Lavik, Statoil's press spokesman, says that if the company does discover large amounts of gas off northern Norway, "it will most probably be brought to land for separation and further processing. The pros and cons of utilizing the dry and wet gas in north Norway will differ from those applying to the North Sea gas."

Lavik says that Statoil is building up a "knowledge bank" for exploitation of Norwegian Sea gas, and he added that Mobil Oil Corp. is taking part in a research project leading to conversion of methanol into synthetic gasoline. This, Lavik feels, could lead to interesting possibilities for potential gas finds farther north. Statoil, however, is interested in more than synthetic gasoline. The company also is studying the possibilities of exporting dry gas to Sweden and Finland, which have already expressed interest in small quantities of the gas for industrial use.

The accompanying table lists proven gas fields that are in production, under development, or capable of being developed. If recent estimates that the entire 31 area contains between 64 and 67 tcf of natural gas are correct, another 21 to 24 tcf can be added to the total of 73.6 tcf.

Norway's probable gas reserves then would exceed 90 tcf. This corresponds to about 18 trillion bbl of oil for Norway, where the current annual comsumption is approximately 67 million bbl.

ÉDITIONS TECHNIP technip
27, RUE GINOUX · 75737 PARIS CEDEX 15 · FRANCE

Publications in English Language

DRILLING DATA HANDBOOK
1 vol., relié, 13x18, 448 p., 188 fig., 257 tabl .... **195 FF**

SEABED RECONNAISSANCE AND OFFSHORE SOIL MECHANICS FOR THE INSTALLATION OF PETROLEUM STRUCTURES
P. LE TIRANT
1 vol., relié, 18x24, 512 p., 204 fig., 57 tabl .... **410 FF**

SEA CLIMATOLOGY
1 vol., broché, 17x24, 426 p., 138 fig., 30 tabl. ...... **250 F**

KEROGEN. INSOLUBLE ORGANIC MATTER FROM SEDIMENTARY ROCKS
1 vol., relié, 18x24, 550 p., 194 fig., 25 tabl......... **490 F**

ENHANCED OIL RECOVERY
M. LATIL
1 vol., broché, 17x24, 252 p., 143 fig., 7 tabl. ...... **210 F**

PROPERTIES OF RESERVOIR ROCKS: CORE ANALYSIS
R. MONICARD
1 vol., broché, 17x24, 184 p., 101 fig., 9 tabl. ...... **172 F**

THE RESERVOIR ENGINEERING ASPECTS OF FRACTURED FORMATIONS
L. H. REISS
1 vol., broché, 17x24, 120 p., 43 fig., 3 tabl......... **120 FF**

Free Catalog on Request

Circle 211 on Reader Service Card

Well Servicing Boom Pushes Costs Over $3 Billion

by Steven D. Moore, *Technical Editor*

TABLE 1. Completion, workover, servicing summary, by region, 1980

Region	Total wells	Completion, recompletion	Total art. lift	Lift repair	New lift installation	Tubular repair	Frac/acid stimulate	Total budget, $M
U.S.(1)	734,728	71,069	500,396	464,566	25,631	56,164	20,119	3,201,074
Appalachia	122,141	7,039	62,146	50,468	1,364	5,709	147	240,460
California onshore	45,847	2,686	42,472	40,419	1,439	3,587	920	159,010
California offshore	1,564	148	1,952	100	13	81	32	32,694
Four Corners	12,730	954	1,434	1,898	1,334	161	56	36,859
Great Lakes	75,543	7,605	53,775	45,560	2,406	5,266	550	149,910
Gulf of Mexico	8,899	735	3,567	721	293	238	171	180,780
Louisiana onshore	33,915	5,275	20,930	20,606	1,512	1,640	1,630	194,840
Mid-Continent	170,286	17,022	131,520	119,592	6,629	15,089	5,968	656,230
Rocky-Williston	28,553	4,400	19,109	20,922	1,494	2,013	3,356	402,340
Texas onshore(2)	231,052	24,713	160,107	161,372	8,962	21,943	7,067	1,118,400
Southeast	4,198	492	3,384	2,908	185	437	222	29,551

(1) Excludes 571 wells in Alaska
(2) Includes southeast New Mexico

For the second year in a row, producers will spend more than $3 billion to work over U.S. oil and gas wells. By year's end, 1981 well servicing expenditures should exceed those of 1980.

Well servicing operators performed nearly 568,000 servicing and repair jobs on 734,728 operating wells in the U.S. during 1980. In addition, 71,000 wells were completed or recompleted last year. The total well servicing budget for 1980 surpassed $3.2 billion.

Well servicing, like the more-publicized contract drilling boom, is rapidly expanding. Inflation helped push the total projected 1981 well servicing budget towards $3.6 billion but the real cause is increased activity, due largely to oil decontrol and rising world oil prices during the last few years. In fact, if PETROLEUM ENGINEER INTERNATIONAL's annual well servicing survey were taken today, after producers felt the effects of President Reagan's decontrol measure, estimated well servicing expenditures would be even higher.

The most significant change in well servicing trends was reduced abandonments – the number of abandoned wells dropped from 9,011 in 1979 to 3,021 in 1980.

This year, PEI divided the survey into 11 different geographic regions – for the first time, the Appalachia area is broken out. Tables 1, 2, and 4 summarize completion, workover, and servicing activities in 1980. Tables 5 through 15 depict servicing operations for individual regions.

Big Budget

Budgets for well servicing costs per well vary from region to region. The largest regional budget for 1980 was in Texas – where it exceeded $1 billion. Last year, Texas wells required 199,344 servicing jobs, plus 24,415 completions and recompletions.

Another area high on the list is the Mid-Continent, where Oklahoma and Kansas are experiencing extensive growth. The area probably has the widest variance in well servicing costs per well because of relatively low maintenance costs for shallow wells, particularly in Kansas, as opposed to high-priced stimulation jobs for many of Oklahoma's deeper wells.

The Gulf of Mexico is again the most expensive region for workover costs per well. Daily rates for workover barges and jackups, along with high transportation charges, cause expenses to climb.

Least expensive of the 11 regions are the Great

TABLE 2. Completions and recompletions of exploration and development wells, by region

	Wells Jan. 1, 1981		Exploration		Development		Recompletions		
	Oil	Gas	Oil	Gas	Oil	Gas	Same zone	New zone	Abandons
U.S.	553,369	181,359	1,595	1,969	25,306	15,506	15,846	10,847	3,021
Appalachia	63,431	58,710	131	334	1,579	4,204	716	75	110
California onshore	44,932	915	88	45	1,667	32	506	348	142
California offshore	1,564	—	2	—	65	—	65	16	5
Four Corners	1,641	11,089	9	25	126	670	74	50	24
Great Lakes	56,136	19,407	225	88	2,792	2,122	887	1,491	47
Gulf of Mexico	5,298	3,601	1	10	130	240	118	236	29
Louisiana onshore	23,296	10,619	32	57	1,146	1,515	1,818	707	334
Mid-Continent	141,236	29,050	288	208	7,072	2,758	4,706	1,990	860
Rocky-Williston	22,383	6,170	236	204	1,345	1,013	613	989	180
Texas onshore	190,071	40,981	556	976	9,215	2,855	6,266	4,845	1,198
Southeast	3,381	817	27	22	169	97	77	100	92

TABLE 3. Tubular goods repair, by region

	Casing			Tubing		
	1978	1979	1980	1978	1979	1980
U.S.	6,631	3,772	6,566	24,615	62,946	49,598
Appalachia	—	—	926	—	—	4,783
California onshore	1,424	71	302	1,505	1,256	3,285
California offshore	—	—	14	—	60	67
Four Corners	—	85	32	—	505	129
Great Lakes	—	300	609	—	4,500	4,657
Gulf of Mexico	23	—	30	24	182	208
Louisiana onshore	211	180	189	1,631	1,513	1,451
Mid-Continent	1,381	1,400	1,944	11,055	25,202	13,145
Rocky-Williston	297	431	377	471	1,255	1,636
Texas onshore	3,295	1,263	2,097	9,929	28,116	19,846
Southeast	—	42	46	—	357	391

Lakes and Appalachia. The low cost per well is due to the shallow depth of most producers and the rod pumping units used–in most cases, the cheapest artificial lift to operate and maintain. However, in the future, these two areas will take an increasing chunk of the total U.S. well servicing budget, as Ohio, Pennsylvania, West Virginia, and Illinois all ranked in the 10 top states for completions in 1980.

Completions Rising

Despite the windfall profits tax placed on decontrolled crude, total well completions rocketed in 1980. It's no great surprise to see 1981's pace even more hectic.

Oil well completions showed the biggest increase–from 19,383 completions in 1979 to 27,026 in 1980. The drilling surge also affected recompletions; operators recompleted some 26,000 wells. Table 2 gives a breakdown of completions and recompletions. Areas having the greatest activity are Texas, the Mid-Continent, and California, where many old, marginal fields are being reevaluated.

For the sixth straight year, producing oil wells increased. In 1980, the number of oil wells reached 553,369–a 5% jump over 1979–with more than 500,000 oil wells on artificial lift. Last year operators brought many abandoned stripper wells back on production. While the total barrels of oil for stripper production increased last year, the average daily production rate for a U.S. oil well sank to under 16 b/d.

Tubular Demand

Worries over supply shortages for new completions lessen as tubular manufacturers increase production and suppliers raise imports. An adequate supply is vital to the well servicing market as tubing replacements should be on a record clip this year. Responses to PEI's survey show a decrease in the number of tubing repairs

TABLE 4. Total U.S. service jobs in 1980

Abandoned (old wells)	3,021
Recompletions–same reservoir	15,846
Recompletions–different reservoir	10,847
Stimulation–acid or frac	20,119
Tubing repair or replacement	49,598
Casing repair	6,566
Rod pump repair	243,020
Sucker rod work	199,507
New rod pump installation	22,467
Submersible pump repair	8,947
New submersible pump installation	1,420
Hydraulic pump repair	9,795
New hydraulic pump installation	781
Gas lift repair	3,297
New gas lift installation	963

TABLE 5. Appalachia service jobs in 1980

Abandoned (old wells)	110
Recompletions–same reservoir	716
Recompletions–different reservoir	75
Stimulation–acid or frac	147
Tubing repair or replacement	4,783
Casing repair	926
Rod pump repair	28,207
Sucker rod work	22,261
New rod pump installation	1,364
Submersible pump repair	—
New submersible pump installation	—
Hydraulic pump repair	—
New hydraulic pump installation	—
Gas lift repair	—
New gas lift installation	—

TABLE 6. California onshore service jobs in 1980

Abandoned (old wells)	142
Recompletions–same reservoir	506
Recompletions–different reservoir	348
Stimulation–acid or frac	920
Tubing repair or replacement	3,285
Casing repair	302
Rod pump repair	19,980
Sucker rod work	16,486
New rod pump installation	1,399
Submersible pump repair	149
New submersible pump installation	9
Hydraulic pump repair	3,605
New hydraulic pump installation	15
Gas lift repair	199
New gas lift installation	16

TABLE 7. California offshore service jobs in 1980

Abandoned (old wells)	5
Recompletions–same reservoir	65
Recompletions–different reservoir	16
Stimulation–acid or frac	32
Tubing repair or replacement	67
Casing repair	14
Rod pump repair	—
Sucker rod work	—
New rod pump installation	—
Submersible pump repair	83
New submersible pump installation	5
Hydraulic pump repair	—
New hydraulic pump installation	—
Gas lift repair	17
New gas lift installation	8

and replacements from 1979 to 1980, while the number of casing repair jobs increased (Table 3). Texas led once again in tubing and casing repairs and replacements, followed by the Mid-Continent.

Pumping Units

Oil wells brought on stream with rod pumping units increased from 9,473 wells in 1979 to 21,029 wells in 1980. Expect an even bigger boost this year as operators continue to tap new fields that were once considered marginal and step up infill drilling in many of the country's older fields. Rod pumping units still supply 85% of all artificial lifts for oil wells.

Last year, approximately 113 million ft of new sucker rods were delivered to the industry, with nearly 20 million ft used to replace old rods. Many operators use new sucker rods for rejuvenated stripper wells because old rods fail more frequently, creating larger well servicing costs. Operators prefer to pay the initial higher cost of new rods in exchange for reduced well servicing bills.

Because of the sucker rod demand increase, new manufacturers are entering the market – many who manufacture non-API rated rods for limited service. These rods have no shoulder joints, so they cost less, but they will not stand up as well as API rated rods under constant stress.

Of the 113 million ft of sucker rods delivered last year, most went to Texas and the Mid-Continent–some 79 million ft in all. Now manufacturers sell only one sucker rod string at a given time to a specified well site to eliminate stockpiling. However, all rod manufacturers are expanding facilities and should be producing additional rods by this fall. Several manufacturers feel that 1981 could be a peak year for the sucker rod business because of all the abandoned wells brought back on production.

Other Lifts

Gas lift also has an increasing marketplace. While new gas lift installations remained about the same as 1979 – approximately 10% of the artificial lift market – gas lift repairs increased by 41% from 1,046 repair jobs in 1979 to 3,233 in 1980. These numbers might be slightly off, however, because several operators feel that "... the majority of gas lift valves are not installed in initial completions". Even though gas lift valves are installed for the first time in a producing well, the

TABLE 8. Four Corners service jobs in 1980

Abandoned (old wells)	24
Recompletions–same reservoir	74
Recompletions–different reservoir	50
Stimulation–acid or frac	56
Tubing repair or replacement	129
Casing repair	32
Rod pump repair	729
Sucker rod work	602
New rod pump installation	1,309
Submersible pump repair	567
New submersible pump installation	25
Hydraulic pump repair	—
New hydraulic pump installation	—
Gas lift repair	—
New gas lift installation	—

TABLE 9. Great Lakes (Michigan, Ohio, Indiana, Illinois) service jobs in 1980

Abandoned (old wells)	47
Recompletions–same reservoir	887
Recompletions–different reservoir	1,491
Stimulation–acid or frac	550
Tubing repair or replacement	4,657
Casing repair	609
Rod pump repair	24,963
Sucker rod work	20,597
New rod pump installation	2,406
Submersible pump repair	—
New submersible pump installation	—
Hydraulic pump repair	—
New hydraulic pump installation	—
Gas lift repair	—
New gas lift installation	—

TABLE 10. Gulf of Mexico service jobs in 1980

Abandoned (old wells)	29
Recompletions–same reservoir	118
Recompletions–different reservoir	236
Stimulation–acid or frac	171
Tubing repair or replacement	208
Casing repair	30
Rod pump repair	—
Sucker rod work	—
New rod pump installation	—
Submersible pump repair	16
New submersible pump installation	1
Hydraulic pump repair	40
New hydraulic pump installation	18
Gas lift repair	665
New gas lift installation	274

TABLE 11. Louisiana onshore service jobs in 1980

Abandoned (old wells)	334
Recompletions–same reservoir	1,818
Recompletions–different reservoir	707
Stimulation–acid or frac	1,630
Tubing repair or replacement	1,451
Casing repair	189
Rod pump repair	10,359
Sucker rod work	8,548
New rod pump installation	939
Submersible pump repair	111
New submersible pump installation	101
Hydraulic pump repair	796
New hydraulic pump installation	128
Gas lift repair	792
New gas lift installation	344

TABLE 12. Mid-Continent service jobs in 1980

Abandoned (old wells)	860
Recompletions–same reservoir	4,706
Recompletions–different reservoir	1,990
Stimulation–acid or frac	5,968
Tubing repair or replacement	13,145
Casing repair	1,944
Rod pump repair	62,805
Sucker rod work	51,821
New rod pump installation	5,870
Submersible pump repair	4,222
New submersible pump installation	690
Hydraulic pump repair	740
New hydraulic pump installation	69
Gas lift repair	4
New gas lift installation	—

TABLE 13. Rocky Mountain-Williston Basin service jobs in 1980

Abandoned (old wells)	180
Recompletions–same reservoir	613
Recompletions–different reservoir	989
Stimulation–acid or frac	3,356
Tubing repair or replacement	1,636
Casing repair	377
Rod pump repair	9,953
Sucker rod work	8,213
New rod pump installation	1,229
Submersible pump repair	567
New submersible pump installation	121
Hydraulic pump repair	2,097
New hydraulic pump installation	116
Gas lift repair	92
New gas lift installation	28

TABLE 14. Texas onshore service jobs in 1980

Abandoned (old wells)	1,198
Recompletions–same reservoir	6,266
Recompletions–different reservoir	4,845
Stimulation–acid or frac	7,067
Tubing repair or replacement	19,846
Casing repair	2,097
Rod pump repair	84,521
Sucker rod work	69,739
New rod pump installation	7,794
Submersible pump repair	3.146
New submersible pump installation	452
Hydraulic pump repair	2,438
New hydraulic pump installation	423
Gas lift repair	1,528
New gas lift installation	293

TABLE 15. Southeast service jobs in 1980

Abandoned (old wells)	92
Recompletions–same reservoir	77
Recompletions–different reservoir	100
Stimulation–acid or frac	222
Tubing repair or replacement	391
Casing repair	46
Rod pump repair	1,503
Sucker rod work	1,240
New rod pump installation	157
Submersible pump repair	86
New submersible pump installation	16
Hydraulic pump repair	79
New hydraulic pump installation	12
Gas lift repair	—
New gas lift installation	—

operator considers the installation as remedial work.

Electric submersible and hydraulic pumps maintain approximately the same percentage of the artificial market (2% each), but the number of wells using these types of lifts is increasing. Approximately 1,450 submersible units were installed in 1980, bringing the total number of electric submersible pumps operating in the U.S. to about 10,940.

In 1979, submersible pumps had an 0.97 failure rate–about 375 days without a breakdown. Service improved last year to an 0.86 failure rate, or a 425-day working life. Hydraulic pumps had approximately the same number of new installations in 1980 as electric submersibles, with about the same failure rate.

Stimulation

Acid and frac stimulation jobs for old wells rose from 19,319 in 1979 to 20,392 in 1980, but the actual number could be even higher. Stimulation jobs are becoming commonplace in many older fields, particularly in Texas and the Mid-Continent.

The Great Lakes and Appalachia area operators are performing more stimulation jobs in an effort to develop tight gas reserves. Bauxite fracs are increasing in the Rocky Mountains as operators search for deeper gas.

Well Servicing Market

While the exploding drilling rig count is well-publicized, the workover rig count is quietly following suit with a banner year. Nearly three-and-a-half new workover rigs enter the market place every day–just a half step faster than drilling rigs.

Well servicing expenditures will continue to increase, but much of the added cost will be due to inflation. The market should continue to expand as more and more wells are brought onstream. However, many forecasters predict 1981 as a peak year due to the decontrol of oil, making marginal wells once again profitable.

Data presented were based on PETROLEUM ENGINEER INTERNATIONAL's 1980 well servicing survey. Responses came from more than 150 independent and integrated companies. Appropriate base data used for projections were corroborated with data published by API and Petroleum Information Corp. ■

U.S. Gas Reserve Estimated At 913 Tcf

Table 1. Total estimated potential supply of natural gas by depth increments, tcf

	Probable	Possible	Speculative
Onshore (drilling depth):			
Lower 48 states			
less than 15,000 ft	116	161	94
15,000 to 30,000 ft	35	103	102
	151	264	196
Alaska			
less than 15,000 ft	6	16	28
15,000 to 30,000 ft	—	—	—
	6	16	28
Total onshore	157	280	224
Offshore (water depth):			
Lower 48 states			
less than 200 m	32	43	35
200 to 1,000 m	2	22	23
	34	65	58
Alaska			
less than 200 m	2	13	68
200 to 1,000 m	—	—	12
	2	13	80
Total offshore	36	78	138
Total lower 48 states	185	329	254
Total Alaska	8	29	108
Total U.S.	193	358	362

The latest evaluation of the remaining potential for natural gas production from conventional sources in the U.S. indicates that present proved reserves, plus the undiscovered potential supply, are most likely twice as large as the cumulative production since the beginning of the industry in the country.

The Potential Gas Committee, an independent group comprised of representatives of the natural gas industry, federal and state agencies, and academic institutions, said recently that exploration drilling and discoveries of the past 2 years have tended to confirm the general picture of the magnitude of the conventional natural gas resource base developed by the committee in its past reports. The latest estimates are based on the committee's biennial evaluation of the results of recent exploration and drilling activity for natural gas.

The estimates consider only those resources believed to be present in subsurface strata and susceptible to discovery and recovery by conventional methods and developing technology. The aggregate of the committee's estimates for various regions of the U.S. represents a resource potential of 913 tcf.

The committee says that more resources exist in the deeper parts (15,000 ft or deeper) of sedimentary basins than were previously estimated. This reflects the generally encouraging results of greater drilling to deeper depths in onshore basins together with the availability of more geophysical information, especially seismic surveys, of better quality.

There has been a definite increase in the number of wells drilled below 15,000 ft, according to PETROLEUM ENGINEER INTERNATIONAL's annual Deep Well Survey. In 1977, 476 wells were drilled below 15,000 ft in the entire U.S., including offshore. For 1980, PEI lists 859 wells drilled to depths below 15,000 ft.

A second trend emerging from the work of the Potential Gas Committee is that less resources are estimated to lie in offshore regions than had been thought previously. Reductions in offshore estimates reflect disappointing results from offshore exploration and drilling in the Baltimore Canyon and in the Gulf of Alaska, both areas where it was thought previously that there was considerable potential for natural gas. The trend is reflected also in a reduction of estimates of the potential for the Gulf Coast offshore region. The committee feels this region has reached maturity in terms of both exploration and production, and there are now greater data available on which to base estimates. In addition, there have been transfers of potential resources to proved reserves and production.

The committee also has come to the conclusion that there probably are smaller resources of natural gas in Alaska than it had previously believed. This is based on the disappointing drilling in the Gulf of Alaska and a re-evaluation of onshore basins based on more geologic, geophysical, and drilling information.

The Potential Gas Committee's estimate of the potential supply of conventional natural gas in the U.S. as of the end of 1980 is given in Table 1. At the end of 1978, the committee estimated that the country's potential supply of natural gas was:

- Probable, 199 tcf.
- Possible, 399 tcf.
- Speculative, 421 tcf.

The total of these estimates is 1,019 tcf.

The U.S. Geological Survey's estimates of undiscovered recoverable resources (PEI, June 1980, p. 142) represent essentially the same quantities as are included in the Potential Gas Committee's possible and speculative categories.

The recent USGS estimates of the potential supply of natural gas are approximately 23% higher than those prepared in 1975. A large part of this increase, however, can be traced to an extension of the offshore area evaluated from a water depth of 200 meters in 1975 to a depth of 2,500 meters in 1980. There is a net increase of 13% in estimates for onshore areas, and a net increase of 56% in estimates for offshore areas. Comparisons of the USGS survey mean estimates of undiscovered recoverable resources and the Potential Gas Committee's estimates of possible and speculative resources are given in Table 2.

Significant Shifts

The new report of the Potential Gas Committee reflects significant shifts in the distribution pattern of estimated potential supply when compared with the report prepared for the end of 1978. For the lower 48 states onshore, 39%

Table 2. Comparison of estimates, conventional natural gas, tcf

	USGS		PGC*	
Year-end	**1974**	**1979**	**1978**	**1980**
	(mean)+		(most likely)+	
Lower 48 onshore	345	390	473	460
Lower 48 offshore	63	102	171	123
Alaska onshore	32	37	48	44
Alaska offshore	44	65	128	93
	484	594	820	720

*Potential Gas Committee estimates are the total of the Possible and Speculative estimates and are comparable to the USGS estimates of undiscovered recoverable resources.

+USGS estimates represent the arithmetical mean derived by adding together maximum, minimum, and most likely estimates and dividing by three. Potential Gas Committee estimates are most likely estimates. These are most nearly comparable estimates from the work of both groups.

of the potential is estimated to lie at depths between 15,000 and 30,000 ft, compared with 32% of the potential in 1978.

Despite a decrease in the total estimated potential for the U.S., estimates for deeper drilling also have been increased in terms of the actual estimated volume, from 199 tcf in 1978 to 240 tcf in 1980.

For the lower 48 states, 20% of the total potential is estimated to occur offshore, compared with 26% in 1978. This represents a decrease in the actual estimated volumes from 216 tcf in 1978 to 157 tcf in 1980.

Alaska now is estimated to contain 16% of the U.S. potential, compared with 19% in 1978. This reflects a decrease in the estimates of Alaskan potential from 189 tcf in 1978 to 145 tcf in 1980.

The Potential Gas Committee is considerably more optimistic than the U.S. Geological Survey about the potential for the eastern U.S., despite USGS's sharp increase in its 1980 estimate compared with 1975. In the offshore area of the Atlantic coast, the Potential Gas Committee estimate is less than that of the USGS, but most of this can probably be accounted for by the additional area included in the USGS estimate.

In the Gulf Coast region, the USGS has a larger estimate for potential onshore than does the Potential Gas Committee, but the reverse is true in the offshore Gulf area. Differences here apparently are due to different interpretations by the two groups.

In the Mid-Continent region, the committee's estimate is considerably lower than that of the USGS, which sharply reduced its estimate for the region. The committee, however, is of the opinion that there remains great potential for the region, particularly in the deeper portions of the Anadarko Basin. The committee also has a somewhat larger estimate for the potential of the offshore area of Alaska than does the USGS, and it is also more optimistic about the potential for the Pacific Coast area, both onshore and off. Estimates for other areas and regions of the U.S. appear to be essentially comparable.

The Potential Gas Committee estimates, which are somewhat more optimistic overall than the estimates of the U.S. Geological Survey, indicate that there still remain about 1,100 tcf of gas, including proved reserves, that can be produced from conventional reservoirs in the U.S. This is about twice the cumulative amount produced throughout the history of the industry to date.

Copies of the complete report, "Potential Supply of Natural Gas in the United States, as of Dec. 31, 1980," are available from the Potential Gas Agency, Colorado School of Mines, Golden, Colo. 80401.

Calvin D. Saunders, vice president of research for Halliburton Services, is shown in front of the award-winning laboratory with a copy of the magazine in which the award was announced.

Halliburton Receives Lab Of Year Award

Halliburton Services' new $40 million research center at Duncan, Okla., has been named Laboratory of the Year by *Industrial Research & Development* magazine.

Headquarters for some 570 engineers, chemists, physicists, and electronics specialists, the 240,000-sq-ft center is designed for eventual expansion to 340,000 sq ft and 700 employees. In announcing its award, the magazine cited design objectives of the Halliburton center as including, "a setting suitable for quality research to provide for interaction and communication within and among the research groups, to provide a low-scale, campus-like atmosphere identifiable as one unified center, and to provide flexibility for expansion and modification through modular building components."

The Halliburton facility is not only the first laboratory in the U.S. Southwest to receive the 14-year-old award, it is the first petroleum industry facility to be so honored. In accepting the award, Halliburton spokesman said, "We are pleased beyond words to join such past winners as the Bell Telephone Laboratories, the Squibb Institute of Medical

NOTE

ONLY THE FOLLOWING PAGES OF THIS

PUBLICATION HAVE BEEN FILMED

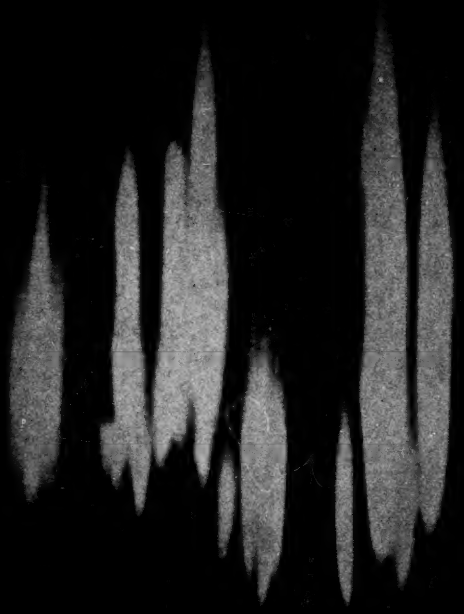
Cover 1, p. 3-4, 10, 12,

14.

Petroleum Engineer

JULY 15, 1981

7/31/81 C 3320-2



ENERGY OPERATIONS & EQUIPMENT FORECAST

Rotary Rigs Reflect Response To Decontrol

by Rich McNally, *Associate Editor*
PETROLEUM ENGINEER International

Keeping up with the '80s will be no problem for America's oil and gas well drillers. But will the '80s be able to keep up with them?

By setting a new record for completions last year, U.S. drillers began the century's penultimate decade in high gear, and are showing no signs of slowing down as higher prices for domestic crude oil and for some categories of natural gas encourage close to 9000 oil and gas operators to employ the services of more than 700 contract drillers.

Last year, U.S. drilling contractors put down 189 million feet of hole to complete 62,462 wells. This represented a 19% increase over 1979's footage and a 21% increase over the earlier year's completion total.

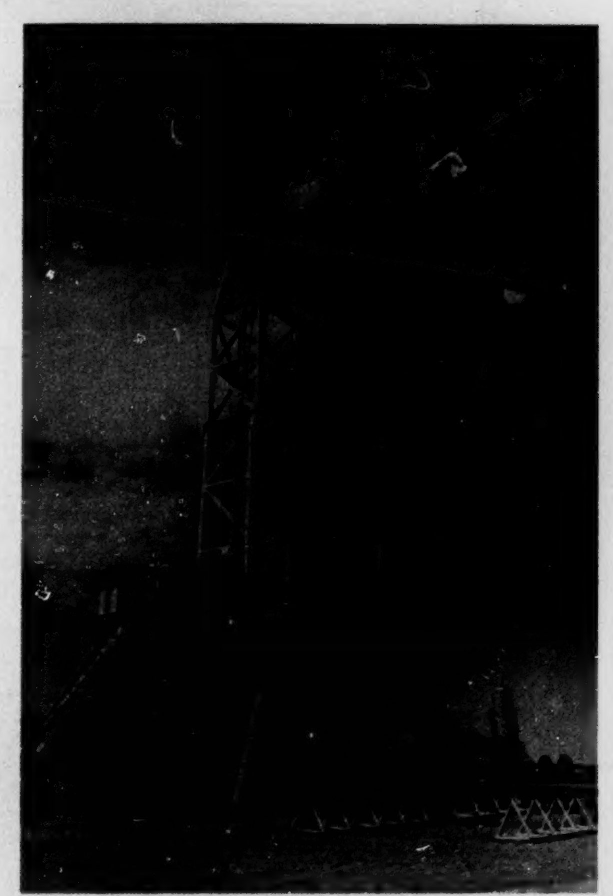
As impressive as these figures are, however, they pale in comparison to cost data. Petroleum Information Corp. (Denver) puts 1980 drilling costs at $19.5 billion, a 41% increase over the $13.8 billion spent during 1979. And 1981 budgets are even higher, with 70,000 to 74,000 wells predicted for this year. This would bring drilling expenditures up to the $30 billion level for the year and continue a trend that could very well see a trillion dollars spent to drill and complete wells in the U.S. during the decade of the '80s.

Decontrol of oil prices, therefore, is achieving just about what the industry said it would. Higher prices and the promise of improved returns for investors have extended and expanded the search for new energy. The industry is not only going farther offshore, it also has begun exploring the complex structures of the Appalachian Basin as well as the Western Overthrust Belt. And exploration is going deeper in the conventional basins of Texas, Oklahoma, California, and Louisiana.

Although decontrol was a long time in coming, the delay provided the oilfield supply industry with plenty of time in which to gear up for the current boom. As a result, lead times associated with some of the major items of oilfield equipment are not regarded as serious enough to constrain drilling activity.

Perhaps the most critical constraints during the mini-booms of the '70s were shortages of oil country tubular goods, but indications are that domestic shipments plus imports will be sufficient to meet requirements for at least the first half of the '80s. Lone Star Steel Co. looks for drillers to consume 7.5 million tons of tubulars in 1985 while drilling 525 million feet of hole with 5740 rigs. Lone Star is one of a number of steel companies that have announced expansion plans during the past year (others include Armco and U.S. Steel), which should provide the necessary additional tubular capacity for the second half of the decade.

Shortages of qualified personnel were another constraint on drilling during the '70s, but it is not something that the industry hasn't been able to overcome. At one point early in the decade, the U.S. active rig count actually dropped below 1000, but today the industry is adding that many rigs each year. And it is coming up with the people to man them. Where they are coming from is anybody's guess, but the word we get from Wyoming is that the drilling boom in that state's portion of the Overthrust Belt is accompanied by a shortage of cowboys, who apparently are trading in their Stetsons and lassos for hard hats and spinning chains.

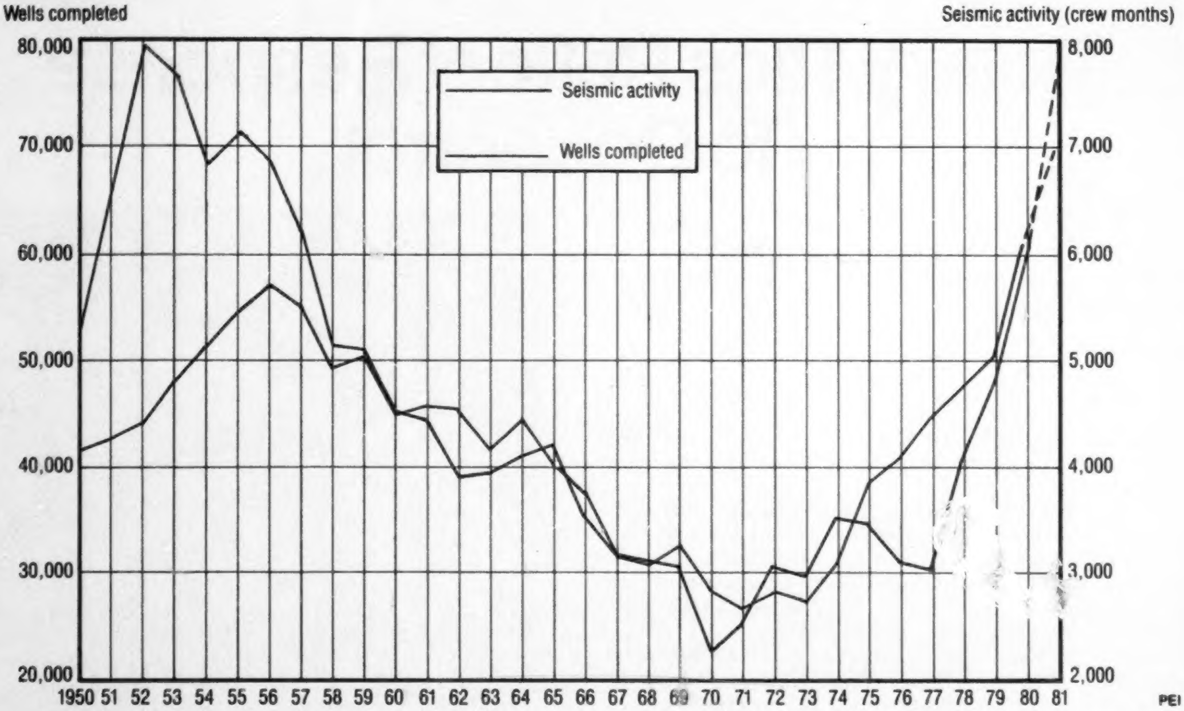


Rowan Co.'s Rig 5 drilling the year's deepest well, GHK Co.'s 26,500-ft Harrell No. 1 and 2, in western Oklahoma.

Drilling contractors, meanwhile, are stepping up their on-the-job training efforts, and there is growing interest in training simulators that will do the same job without sacrificing valuable rig time.

Although today's rig-building boom could result in a certain amount of overcapacity within the next few years, there appears to be little danger of overproduction of such consumable items as drilling bits, electronic logs, and drilling muds.

The contract research and development firm Gorham International Inc. of Gorham, Me., says that the future demand for mud minerals is "very bullish because drilling rates are up sharply, and because every well drilled requires 300 to 500



Close correlation between drilling and seismic activity is illustrated in this graph which shows both activities at their highest levels in 30 years.

tons of drilling fluid, regardless of whether that well is dry or becomes a gusher."

Rotary drilling is here to stay, for the foreseeable future at least, but a number of interesting bit developments are expected to have a definite impact on the drilling scene before long. Mud motors, for example, have been a staple in directional drilling for years, but motors available today are powerful enough for intensive long-term use, and there is growing interest in their ability to drill straight through tilted formations.

Another bit development that is attracting the attention of drilling contractors around the country is the artificial diamond blanks that offer both the hardness and abrasion-resistance of diamond and the impact-resistance of tungsten carbide. Bits with the Stratapax teeth are an added factor in the renewed popularity of mud motors for straight hole drilling because they require less weight in the drill string and less power on the bit.

So, things seem to be going the industry's way for a change. The U.S. drilling rig fleet now numbers more then 4000, with well over 3800 actively at work at mid-year. If the federal government chooses to continue lifting its heavy hand–repeal the "windfall profits" tax, for example, and throw out complicated and inconsistent restrictions on natural gas pricing – most industry authorities agree that the drilling effort will continue to surge.

With market forces in command, the industry would have the incentive to drill 100,000 wells each year for 40 years, according to George P. Mitchell, president of Mitchell Energy & Development Corp. "And when we're drilling at the rate of 100,000–an amount the nation's geology can support," Mitchell says, "OPEC's clout will be softened beyond recognition. In the year just ended, with a record number of wells, we stopped the downward trend in oil production and almost did it in gas production. In the present year (1981), I believe the industry will drill 10,000 more wells than in 1980. And when we reach an annual rate of 85,000 wells a year, we'll find as much natural gas as we're using."

Another call for removal of restraints on energy production comes from Charles J. DiBona, president of the American Petroleum Institute. He says, "For the country to take full advantage of the stimulus that market forces are giving to drilling, there must be some changes in government policy.

"To cut imports in half by 1990," he says, "there is need for more energy from federal lands, a better balance between environmental progress and resource development, and consistent, timely government decisions on nuclear regulatory questions."

The leading indicator of future drilling activity, of course, is the number of seismic crews active at any one time. Here, too, the outlook can only be described as bullish. Word just in from the Society of Exploration Geophysicists reflects a dramatic increase in the number of seismic land crews and marine vessels searching for oil and gas in the U.S. and offshore. The total increased from 610 in March to 645 during April, the highest total since the third quarter of 1953. This represents a 30% increase over April 1980, and 79% over April 1979.

All signals are "go" for drilling in the '80s – even without repeal of the "windfall profits" tax, because institutional investors from outside the industry stand ready to pick up the slack by investing in oil and gas exploration as a means of keeping pace with inflation.

The petroleum industry is ready, willing, and able to fuel the U.S. economy through what promises to be a turbulent decade. The only question is whether the '80s will come through with the proper climate for the necessary drilling effort. An effort which will not only be expensive, but which will set new standards for equipment, technology, and people. ■

Pipeline Construction Activity Rated High

by Dean Hale, *Editor, PIPELINE & GAS JOURNAL*

At mid-1981 over 81,000 miles of crude oil, refined products, natural gas, and slurry pipelines are planned or under construction around the world. More than $12.3 billion will be spent during the year to install an estimated 23,990 miles of cross-country pipelines of all types.

In the United States, that includes 10,440 miles of liquids and gas pipelines costing more than $2.52 billion. Outside the U.S., some 13,550 miles of new pipelines will be installed at a cost exceeding $9.7 billion.

The trend for the remaining two decades of this century is for more and more–more pipelines of all kinds to transport an increasing number of commodities. Those commodities include the perennial favorites – crude oil, refined products, natural gas liquids, natural gas, and coal slurries–plus chemicals of all types, ammonia, industrial gases such as oxygen and nitrogen, carbon dioxide (to be used for enhanced recovery of oil), solids slurries including ores and other non-soluble minerals, and even such items as wood chips.

In a major study of U.S. and Canadian pipeline requirements to the turn of the century, Bechtel's Peter G. Behr and Steven Davenport *(see Pipeline & Gas Journal, June 1981)* estimate a minimum of 33 major inter-regional pipeline projects, involving 50,300 miles, will be needed by the year 2000. This projection includes 8 oil pipeline projects totalling 8900 miles; 11 gas pipeline projects totalling 26,000 miles, and 14 slurry pipeline projects totalling 15,400 miles.

PIPELINE & GAS JOURNAL estimates that some 200,000 total miles of new cross-country pipelines will be needed during the 1981 to 2000 period–including major interregional lines, intra-regional lines, loops on existing systems, additional offshore pipelines, and gathering system lines – an average of 10,000 miles per year.

"Super projects" such as the Alaska Highway Gas Pipeline Project will continue to capture the spotlight, but the bread-and-butter pipeline activity will keep the manufacturers of pipe, valves, fittings, pumps, compressors, coatings, and construction machinery in business and help pay the bills.

Internationally, pipeline activity continues to grind away at a steady pace with many new, moderately sized projects announced, plus a few undertakings somewhat more grandiose. Nigeria, frustrated by an inability to get a long-planned LNG export plant and terminal built or financed, now proposes to build a 2500-mile, 40 to 48-in. gas pipeline across western Africa from the Bonny area to the Mediterranean, with branches connecting to either (or both) the Trans-Mediterranean Gas Pipeline and the SEGAMO project proposed to Spain and France (involving a very deep line across the Mediterranean).

In West Germany, two liquid lines are in the news — an 81-mile, 22-in. crude oil line from Wilhelmshaven to Hamburg, proposed by Esso AG and Deutsche BP, and a 186-mile LPG line from Wilhelmshaven to the Ruhr, planned by Mobil Oil AG and Industrieverwaltangs GmbH.

Crude oil and products lines occupy headlines elsewhere. In Panama, work is underway and pipe ordered for a 78-mile, 36-in. line across the Isthmus that will permit bypassing of the crowded Panama Canal. In Colombia, ECOPETROL is planning a 186-mile, $47 million crude line. In Australia, a 240-mile crude oil and condensate line is now planned from Moomba in the Cooper Basin to Stoney Point in South Australia, site of a new refinery. New Zealand is the site for a $55 million, 101-mile products line from Marsden Point to Auckland.

Argentina, where 1240 miles of 30-in. and smaller lines are now under construction, is planning another 1000 miles of 30-in. and larger system to feed natural gas to Sao Paulo, Brazil, and to several Uruguayan cities as part of a massive export program. The Soviet Oil and Gas Ministry has announced that it will build 31,000 miles of gas pipelines during 1981-1985, most of them in western Siberia; the plan does not include the 2000-mile, $11 billion Yamul Peninsula-to-Europe project currently being studied and promoted.

In the North Sea, work is underway on 44 miles of 24-in. from the West Sole Field to Easington, U.K., and government, British Gas, and private interests continue to debate the merits of a 600-mile major offshore gas gathering system. Success of the gas gathering system would depend, partially, on whether Norway will commit gas from the Statfjord re-

1981 Pipeline Construction

(Estimated Miles Completed During Year)

	U. S.	International	Total
Gas			
Transmission	3610	3177	6787
Field, Gathering, Storage	1850	1950	3800
Total	**5460**	**5127**	**10587**
Crude			
Trunk	412	2860	3272
Gathering	1590	1800	3390
Total	**2002**	**4660**	**6662**
Products			
Refined Products	785	1090	1875
LPG/NGL	1380	1545	2925
Total	**2165**	**2635**	**4800**
Offshore			
Oil	181	518	699
Gas	634	610	1244
Total	**815**	**1128**	**1943**
GRAND TOTAL	**10,442**	**13,550**	**23,992**
Prime Movers (Est. HP Installed)			
Compressor	401,000	720,000	1,121,000
Pump	228,800	183,000	411,800
Total	**629,800**	**903,000**	**1,532,800**

serves. Norway, on the other hand, is carefully studying its options, including building a major gas pipeline link to Ekofisk (with gas then going to Emden via an existing gas pipeline) and a gas pipeline across the Norwegian Trench to the Norwegian mainland. Whatever happens must happen by 1985-86, at which time the reinjection of gas into the Statfjord reservoir will have to be discontinued to prevent damage to the formation.

British Gas currently is completing work on the remainder of its 280-mile, 42-in. Fourth Feeder from St. Fergus *(see May 1981 issue of P&GJ)*. In Italy, crews are working on six major sections of the 48-in. Trans-Mediterranean Gas Pipeline for SNAM and plan to have the line complete to the Rome area by year's end.

In Brazil, work continues on the 280 miles of 12 through 24-in. being installed at Campos Basin. In Mexico, Pemex has 342 miles of major 48-in. gas pipeline underway, and another 2667 miles of various sizes of gas and products lines. In Spain, ENAGAS has announced plans for a 155-mile gas pipeline south of Madrid to Catagena and Marcia and a 150-mile line from Madrid to Burgos. Kuwait has announced plans for some 60 miles of new offshore/onshore gas pipelines.

Victoria Gas & Fuel Corp. of New Zealand has announced plans for 55 miles of 30-in. gas line to be completed by 1983. In Australia, work will get underway in January on the 81-mile, 36-in. pipeline to bring Northwest Shelf gas to shore. Meanwhile, planning and design work continues on the 940-mile 26 or 30-in. pipeline that will take the gas from near Dampier southward to Perth.

Pipeline activity in the Middle East has slowed somewhat, with completion of the Petromin 48-in. crude oil line (800 miles) and the Aramco 747-mile NGL line, both terminating at Yanbu on the Red Sea. In Abu Dhabi, work is nearing completion on ZADCO's 746 miles of 4 to 48-in. Several major gas and NGL lines in Algeria are under construction, with completion dates varying from fall 1981 to late 1982.

Domestically, the "big" project—the Alaska Highway Gas Pipeline—has its "below the border" sections well underway, plus a substantial amount of work in progress in Alberta, British Columbia, and Saskatchewan. The 161-mile western leg (Pacific Gas Transmission) will be complete by late summer and the 823-mile Northern Border Pipeline from Ventura, Iowa to Monchy, Sask. will be ready by year's end. Nova Corp. has 395 miles of 42-in. underway on its eastern leg from Monchy, Sask., to Caroline, Alta.

The big pipeline, now estimated to cost $30 billion, reports progress in obtaining financing. Three major gas producers at Prudhoe Bay–Exxon, ARCO, and Sohio–will have a 30% ownership in the line. Design of the huge gas processing plant at Prudhoe Bay, a major step in getting the line into operation, is well underway by the Parsons Co. of Pasadena, Calif.

Numerous new gas pipeline projects have been announced as exploration and drilling around the nation turn up substantial new reserves. El Paso Natural Gas is building 107 miles of 20-in. and adding 3500 hp that will give it access to considerable reserves in the Anadarko Basin. American Natural is planning a 375-mile, 24-in. "Pathfinder" pipeline from near Cheyenne, Wyo. southeast to Greensburg, Kansas. The Trailblazer pipeline project–797 miles of 30 and 36-in. to move Overthrust Belt gas from the Wyoming-Utah-Colorado area to Midwest markets, remains on tap, as do the Rocky Mountain Pipeline (695 miles of 20, 30, and 36-in.) proposed by Pacific Gas Transmission, and the Trans-Anadarko Pipeline System involving 635 miles of 36-in.

Northwest Pipeline Co. has completed 340 miles of 24 and 30-in., while Florida Gas is awaiting approval on 309 miles of 30-in. loops on its system, and Colorado Interstate Gas Co. is planning 300 miles of 26 and 30-in. loops on its system. Boundary Gas Co., to be built and operated by Tennessee Gas Pipeline and owned by 14 gas companies, is planning 294 miles of 10, 12, 26 and 30-in.

Northern Tier Pipeline expects action this year on its proposal to build a 1550-mile, 40 and 42-in. crude oil line from the Seattle area to Clearbrook, Minn. Western Crude Oil of Denver is building 115 miles of 10-in. from Medford, Okla., to Conway, Kan., and another 47 miles of line in South Texas near Giddings.

Energy Transportation Systems, Inc. expects to receive its final EIS from the Bureau of Land Management in late July. The ETSI system is in the final design stage and ROW acquisition is underway. Work on the coal slurry line is expected to begin in 1982.

Canadian pipeline activity is at its best in recent years. In addition to the nearly 400 miles of 42-in. underway by Nova on the Alaska Highway Gas Pipeline Project, TransCanada PipeLines has 64 miles of 48-in. loop underway and plans another 221 miles of 42 and 48-in. loop later this year. First stage of the Quebec and Maritimes gas line–100 miles of 30-in. – may also be underway this year. TransCanada also has proposed a 235-mile, 42-in. "shortcut" from North Bay to Morrisburg (southeast of Ottawa) that may see action this year.

British Columbia Hydro has won approval for a 212-mile, 12, 16, and 24-in. system to bring gas from the mainland to Vancouver Island at a cost of $231 million. Not to be forgotten is the Polar Gas Project, involving some 2300 miles of 36 to 48-in. pipeline, that is still under study.

Liquids pipelines projects include a dual 89-mile system from Lloydminster to Cold Lake for Husky Oil involving a 6-in. condensate line and a 12-in. heavy oil + condensate return line. Similarly, Alberta Energy will build a dual 145-mile system from Cold Lake to Edmonton, also with a 6-in. condensate line and a 12-in. heavy oil + condensate return line.

Alberta Products Pipeline is currently building a 196-mile, 10-in. products line from Edmonton to Calgary. Dome Petroleum, Westcoast Transmission, and Canadian Occidental Petroleum Ltd. reportedly are planning a 500-mile, 10-in. line to transport NGL from Prince George, B.C. to Prince Rupert and Kitimat, B.C. And, finally, approval has been given for a $360 million crude oil line from Norman Wells to Northern Alberta, to be built by Interprovincial Pipeline.■

Gas Distribution Growth Continues

by Jim Watts, *Assistant Editor, Pipeline & Gas Journal*

Statistics can be confusing, but the trend of figures relating to gas distribution tell an easy-to-read story: customers, industrial as well as residential, realize gas is efficient, available, and all in all, very cheap for the price.

Residential demand is still good, despite a depressed new housing market due to high interest rates, and conversions are high as more and more customers move away from expensive oil and electricity. Gas utilities will add 650,000 to 750,000 customers during 1981, down from the 820,000 added during 1980. More than $2.019 billion will be spent during the year on 29,219 miles of new distribution piping and outlays for maintenance of the nation's 1.35 million miles of existing services. Total number of customers served as of Dec. 31, 1980, was more than 46.7 million.

The 1981 estimate is 13.05% higher than the $1.786 billion spent for new and replacement mains and services and system maintenance in 1980, and expenditures in 1980 were a record 14.6% higher than the expenditures in 1979 of $1.558 billion. Increasing budgets reflect demand for gas energy in an economy that still has to pick itself up, and also that inflation is continuing to add to the burden of paying for ever more expensive labor, materials, and construction equipment.

One of the ways the industry is fighting inflation is with plastic pipe, which is cheaper than steel pipe and can be installed easier and without highly specialized skills, such as welding. More than 78% of all the pipe installed in 1980 was plastic, the seventh year in a row that plastic pipe accounted for more than half the pipe installed. In 1981, utilities plan to install 22,234 miles of plastic pipe to add to the 176,087 miles currently in the ground.

American Gas Association's latest capital expenditures outlook anticipates more than $401 billion in gas industry expenditures between 1981 and 2000, of which a projected $124 billion (or more than $6 billion a year) will go into construction and maintenance of cross-country pipelines and utility mains and services.

Peakshaving supplies are ample to protect the 46.7 million customers, 38 million of whom heat their homes with natural gas. Underground gas storage, propane-air, peakshaving LNG, and other supplemental fuels totaled 71.68 Bcf during the 1980-81 winter, up from 69.86 Bcf in the 1979-80 winter. Major U.S. utilities such as Southern California Gas Co., Columbia Gas System, El Paso Natural Gas Co., and others will spend nearly $328.1 million in 1981 for underground gas storage and related facilities. ■

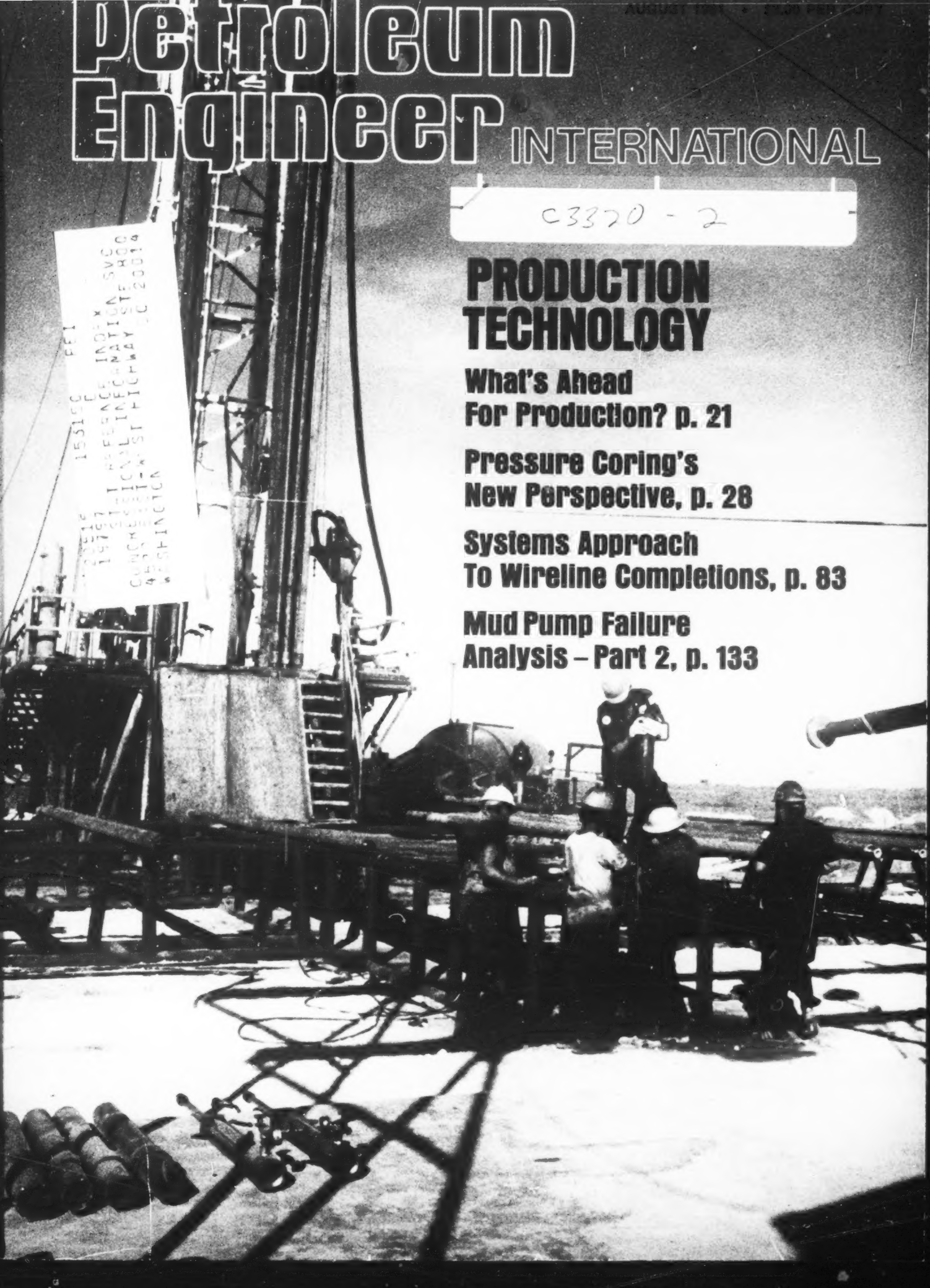
U.S. GAS DISTRIBUTION PIPING — 1980-1989

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
Projection										
Miles of Gas Mains Installed	13,573	13,744	14,900	14,800	14,400	14,600	14,200	14,200	14,700	15,100
Miles of Gas Services Installed	14,379	15,475	14,200	14,600	14,700	15,000	15,600	15,550	15,900	15,900
Total	**27,952**	**29,219**	**29,100**	**29,400**	**29,100**	**29,600**	**29,800**	**29,750**	**30,600**	**31,000**
Construction Expenditures, Distribution ($Billion)	1.781	2.019	2.381	2.646	2.987	3.402	3.870	4.299	4.872	5.370

AUGUST 1981 • $3.00 PER COPY

Petroleum Engineer INTERNATIONAL

C3370 - 2



PRODUCTION TECHNOLOGY

What's Ahead For Production? p. 21

Pressure Coring's New Perspective, p. 28

Systems Approach To Wireline Completions, p. 83

Mud Pump Failure Analysis – Part 2, p. 133

20516 153150 FEI
19797 C
ST-T REFERENCE INDEX
CONGRESSIONAL INFORMATION SVC
4520 EAST-WEST HIGHWAY STE 800
WASHINGTON DC 20014

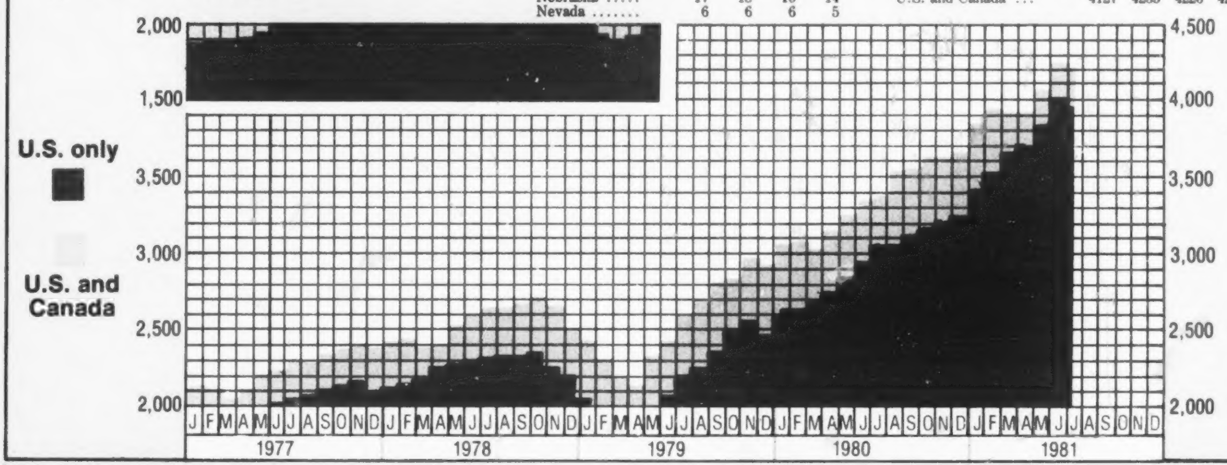
U.S. Drillers Increase Weekly Average By 964.5

U.S. rotary drillers upped their average by 964.5 active rigs during the first half of this year as compared with the first 6 months of 1980. At the mid-year mark in 1981, the average weekly count by Hughes Tool Co. stood at 3,666.9. Last year at the same time it was 2,702.4.

In poor Canada, the reverse is true. Last year at the end of June that country's weekly average stood at 387.8. This year, it is 295.1.

U.S. drillers began the second half of this year by dropping out of the 4,000-bracket they had reached during the last two weeks in June. The rig count for the first week in July was 3,984, and that marked the first time this year that the count had been in the 3,900-bracket. Between June 15 and June 22, the drilling industry had added 109 active rigs to bypass the 3,900s altogether.

	June 15, 1981	June 22, 1981	June 29, 1981	July 6, 1981
Alabama				
Land	15	14	21	19
Offshore	3	3	3	3
Alaska				
Land	19	18	18	18
Offshore	4	4	4	4
Total	23	22	22	22
Arkansas	31	32	32	31
Arizona	1	1	1	1
California				
Land	133	136	131	131
Offshore	20	[illegible]	20	20
Total	153	156	151	151
Colorado	76	80	87	87
Florida				
Land	6	6	6	7
Offshore	2	2	2	2
Total	8	8	8	9
Georgia	1	1	2	1
Hawaii	1	1	1	1
Idaho	3	3	4	2
Illinois	24	29	27	36
Kansas	198	197	198	191
North Louisiana	65	75	75	78
South Louisiana				
Inland Waters	84	84	81	79
Land	153	149	146	147
Offshore	141	148	153	161
Total	443	456	455	465
Maryland	1	1	1	1
Michigan	40	40	38	30
Mississippi	70	70	66	62
Montana	81	80	80	81
Nebraska	17	18	16	14
Nevada	6	6	6	5
New Mexico	131	132	138	134
New York	12	11	12	11
North Dakota	123	132	123	127
Ohio	103	119	120	111
Oklahoma	657	665	680	689
Oregon	2	2	1	1
Pennsylvania	32	36	35	37
Rhode Island				
Offshore	1	1	1	1
South Dakota	4	2	2	1
Tennessee	0	0	1	0
Texas				
Offshore	70	73	71	71
Dist. 1	71	70	72	75
Dist. 2	67	73	62	65
Dist. 3	240	261	273	253
Dist. 4	117	121	118	118
Dist. 5 & 6	173	173	172	173
Dist. 7B	84	85	86	87
Dist. 7C	97	95	93	87
Dist. 8	156	167	163	162
Dist. 8A	85	85	88	101
Dist. 9	94	95	88	87
Dist 10	68	71	69	70
Total	1322	1369	1355	1349
Utah	73	77	71	74
Virginia	3	3	2	3
Washington	1	1	2	2
West Virginia	42	45	47	46
Wyoming	198	195	198	192
Total U.S.	3899	4008	4007	3984
Western Canada	224	223	214	227
Eastern Canada	4	4	5	7
U.S. and Canada	4127	4235	4226	4218



PETROLEUM ENGINEER INTERNATIONAL • 800 Davis Building • Dallas, Texas 75202 • **TWX** 910-861-9306

Abbott Sparks	President
John G. Grant	Publisher and Vice President
W. B. Bleakley	Editor
Richard D. McNally	Associate Editor
Steven D. Moore	Technical Editor
Mary Jane Ellis	Assistant Editor
Laura Jacobus	Assistant Editor
Edna Taylor	Editorial Assistant
J. E. (Henk) Kastrop	Consulting Editor
Renn Rothrock, Jr.	Consulting Editor
Ernestine Adams	Editor, Energy Management Rpt.
Gregory Martin	Editor, Energy News/Energy Week
Sharon Hutcheson	Editorial Assistant
Brenda Hyde	Promotion
Alan Hilton	Service R&D Manager
Danlee Tevis	Service R&D Department
Olga Dunn	Reader Service

ADVERTISING SALES OFFICES

EASTERN: Richard Martin, P. O. Box 89, Tennent, New Jersey 07763, (201) 446-3230

CHICAGO 60646: Dwain Holmgren 4761 West Touhy Ave., Lincolnwood, Illinois (312) 679-1100

OHIO, WESTERN PA.: Dwain Holmgren, 4761 West Touhy Avenue, Lincolnwood, Illinois (312) 679-1100

LOS ANGELES 91106: Bruce Berkey, 81 S. Lake Ave., Box 4566, Pasadena, Calif., (213) 681-0685

HOUSTON 77027: Jess Adkins, Vice Pres., Gulf Coast Regional Manager, **Barry Biklen, Hal Odum,** 4151 Southwest Freeway Suite 115, (713) 626-7850

DALLAS 75202: Ed Sealey, Rusty Meador, George Galloway, 800 Davis Bldg., (214) 748-4403, TWX 910-861-9306

WEST TEXAS: Rusty Meador, P. O. Box 611, Eldorado, Texas 76936 (915) 853-2689

UNITED KINGDOM, NETHERLANDS, SCANDINAVIA: Bryan Clark, Energy Publications Div. HBJ, 24/28 Oval Road, London NW1 7DX, England, (01) 485-7074 (OR 7075). Cable: HARBREX London NW1: Telex: 25775

FRANCE, ITALY, BELGIUM, SWITZERLAND: Gerard Lasfargues, 32, rue Desbordes Valmore, 75016-Paris, France, Telephone: 504 97 94

JAPAN: Mashy Yoshikawa, Orient Echo, Inc., 11th Floor Sankyo Bldg., 7-12 Tsukiji 2-chome, Chuo-ku Tokyo, Telephone: 541-4923, Cable: MYORIENTECHO

GERMANY, AUSTRIA: S.I.P.A.S., **Wim. J. M. Sanders, Paul J. Verbunt,** Raadhuisstraat 24, P. O. Box 25, 1484 EN Graft-de Ryp, Holland, Telephone 02997-1303 and 3660. Telex: 13039 sipas nl, Telegrams: SIPAS-Amsterdam

Jane Dietz	Production Department Manager
Don Fickert	Graphics Director
Janell Fowler	Production Manager
Debbie Cooper	Production Coordinator
Dennis Howard	Presentation
Laura Page	Presentation
James Duke	Presentation
Victoria Valentin	Presentation
Gary Hogan	Business Manager
Jack Schabel	Circulation Director
Royal Courtney	Circulation Fulfillment Manager

ENERGY PUBLICATIONS
• a Division of Harcourt Brace Jovanovich •
P.O. BOX 1589 • 800 DAVIS BUILDING
DALLAS, TEXAS 75221 • (214) 748-4403

PETROLEUM ENGINEER INTERNATIONAL
Pipeline & Gas Journal
Energy Management Report
Energy News • Energy Week

HBJ A HARCOURT BRACE JOVANOVICH PUBLICATION ABP ABC

HARCOURT BRACE JOVANOVICH PUBLICATIONS

ROBERT L. EDGELL, Chairman; RICHARD MOELLER, President; LARS FLADMARK, Executive Vice President; ARLAND HIRMAN, Treasurer; JOE BILDERBACH, Vice President; JAMES GHERNA, Vice President; GEORGE GLENN, Vice President; THOMAS GRENEY, Vice President; EZRA PINCUS, Vice President; HARRY RAMALEY, Vice President; ABBOTT SPARKS, Vice President. OFFICES: 757 Third Avenue, New York, N.Y. 10017. Phone (212) 888-4444; 1 East First Street, Duluth, Minnesota 55802. Phone (218) 727-8511. 111 East Wacker Drive, Suite 1730, Chicago, Ill. 60601. Phone (312) 938-2300.

EDITORIAL ADVISORY COMMITTEE
Lloyd E. Elkins, Petroleum Consultant
Bennie L. Franks, Senior Vice President, Reserves Management and Technology, Sun Production Co.
Dennis E. O'Brien, Technology Section Head, Exxon Chemical Company
B. R. Jones, President, Eagle Production and Drilling Co.
Frank Schuh, Director of Engineering Development, ARCO Oil and Gas Co., a Division of Atlantic Richfield Co.
Marius J. Mes, Senior Research Scientist, Production Research Department, Conoco Inc.

PETROLEUM ENGINEER INTERNATIONAL (USPS 429-380) published 15 times each year, monthly plus March 15, July 15 and November 15, by Energy Publications Division, Harcourt Brace Jovanovich, P. O. Box 1589, Dallas, Texas 75221.

August 1981, Volume 53, No. 10. Copyright© 1981 by Harcourt Brace Jovanovich, Inc. All rights reserved. No part of this publication may be transmitted or reproduced in any form or by any means, electronic or mechanical, including photocopy, recording, or any information storage and retrieval system, without permission in writing from the publisher. Subscription rate to personnel employed by companies involved with exploration, drilling, production, or field processing of oil or gas: one year $12.00, two years $18.00, three years $24.00 for North, Central, and South America. Outside North, Central, and South America: one year $25.00, two years $35.00, three years $45.00. Subscription rate for all others: $25.00 for one year. Single copy price $3.00. Second class postage paid at Duluth, MN and additional mailing offices.

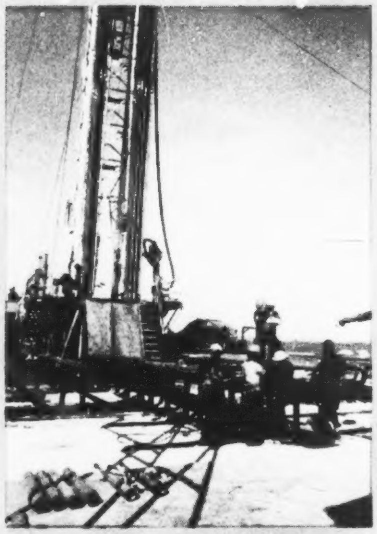
Microfilm copies are available through University Microfilms, Inc., 313 North First Street, Ann Arbor, Michigan. Indexed by Applied Science, Technology Index and the Engineering Index, Inc.

Postmaster: Send address changes to PETROLEUM ENGINEER INTERNATIONAL, P.O. Box 1589, Dallas, Texas 75221, USA.

Petroleum Engineer® INTERNATIONAL

The international magazine of methods for engineering/operating people

AUGUST 1981 NUMBER 10 VOLUME 53



ABOUT THE COVER: A core barrel that had been prepared in a field laboratory is shown being transferred to a drilling rig in the Wasson field of West Texas. For a full report on innovative pressure coring, see p. 28. (Photo courtesy of H.J. Gruy and Associates Inc.)

NEXT MONTH: Drilling equipment and technology have never been more important, which is why the annual Drilling Technology Report in the September issue will be timelier than ever this year.

PRODUCTION TECHNOLOGY

Sun VP Looks At Production's Future 21
Exclusive interview with Bennie L. Franks, Sun Production Co.

Pressure Coring Provides Innovative Approach To Tertiary Recovery Evaluation 28
by T. E. Swift and Raj Kumar, H.J. Gruy & Associates, John Goodrich, Gruy Federal Inc., and R. L. McCoy, Patterson, Powers & Associates

Continuous Injection Method Controls Downhole Corrosion—Part 2 54
by J. B. Bradburn and R. B. Todd, Tenneco Oil Co.

How To Evaluate Water Treating Equipment 73
by Bob Sevin, Nalco Chemical Co.

Well Completions And Workovers—Part 16 83
by L. Douglas Patton, Keplinger Operating Co., and W. A. Abbott, Great Eastern Energy and Development Corp.

Coalbed Methane Gains Viability 101
Staff Report

Calculator Yields Permanent Deep Water Mooring Forces 108
by Marius J. Mes, Conoco Inc.

New Unit Cuts Gas-Sweetening Cost 130
Staff Report

Mud Pump Failure Analysis—Part 2 133
by Edwin C. Lewis II, Innovative Concepts

ENERGY management report™

by Ernestine Adams

Comment EM 1
Energy World Report EM 2
International Design & Engineering EM 6
Oil & Gas Professional Opportunities EM 7
Financial Notebook EM12
New Products EM13

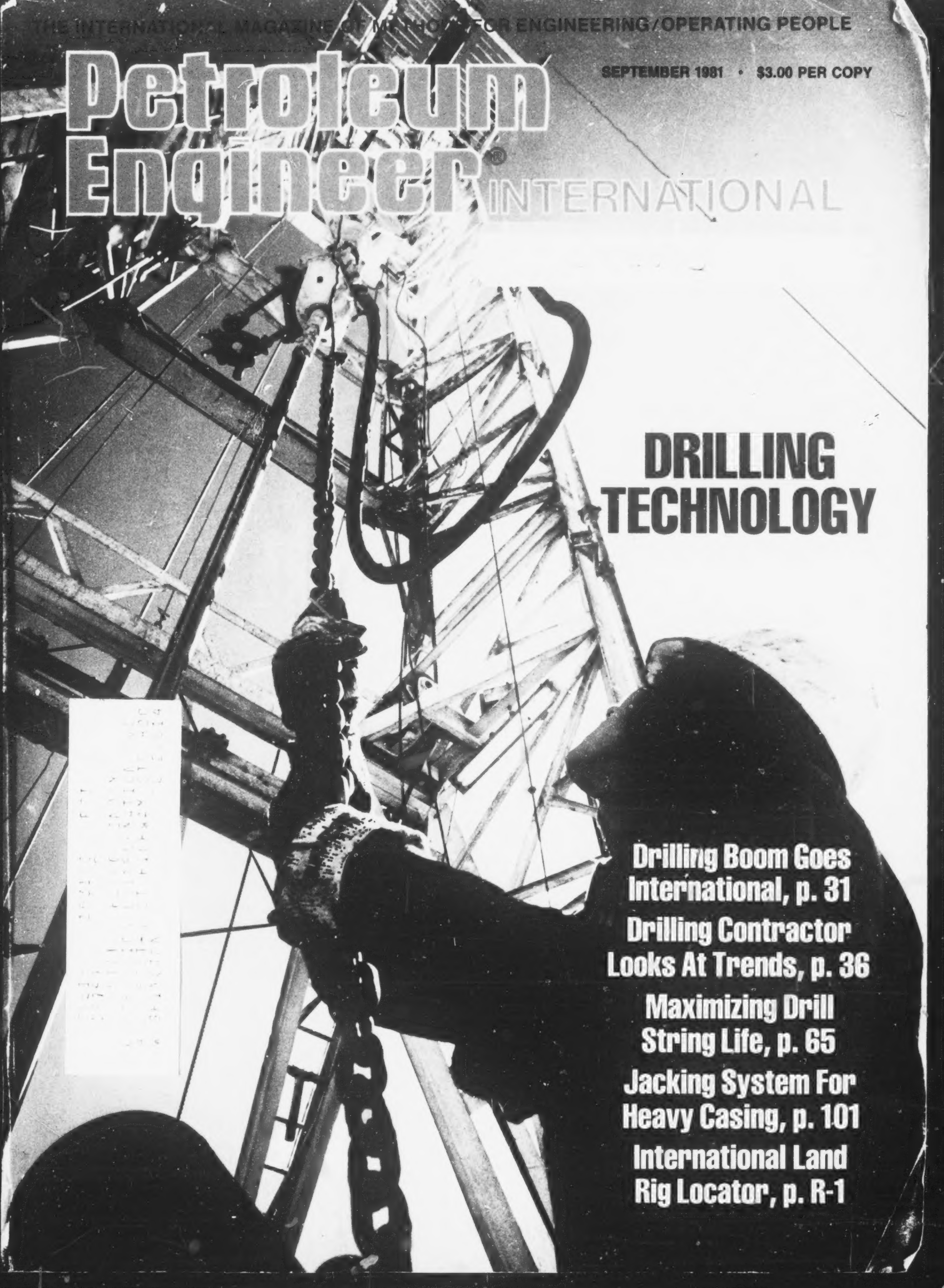
EDITORIAL DEPARTMENTS

News Hi-lites 1
Significant Happenings in Petroleum
Course of Oil 6
The Wrong Time To Be Complacent
Technology Trends 8
Forecasts from Current Events
Offshore Technology 10
OTEC Biofouling
Continuous Tables 125
PE Quiz 150
by Dr. Monica A. Jorque
Drilling/Exploration 152
Big Rig Dedicated
Industry Meeting Calendar 161
Company News 164
Petroleum Profiles 166
Five Minutes with Don Ray
Book Reviews 174
Professional Directory 174
Index to Advertisers EM-18

THE INTERNATIONAL MAGAZINE OF METHODS FOR ENGINEERING/OPERATING PEOPLE

Petroleum Engineer® INTERNATIONAL

SEPTEMBER 1981 • $3.00 PER COPY



DRILLING TECHNOLOGY

Drilling Boom Goes International, p. 31

Drilling Contractor Looks At Trends, p. 36

Maximizing Drill String Life, p. 65

Jacking System For Heavy Casing, p. 101

International Land Rig Locator, p. R-1

U.S. Drillers Continue Record-Breaking Pace

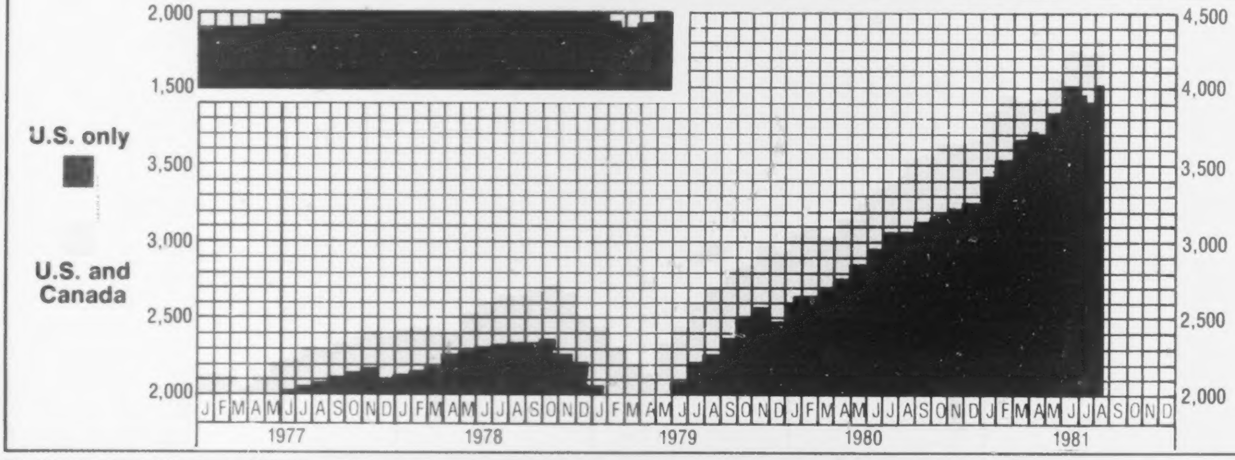
Rotary drillers in the U.S. are continuing their incredible assault on all-time standards that are not even a year old. At mid-August, with more than 4,100 active rigs, they seemed to have left behind the 4,000 barrier that had been a minor obstacle during June and July to their year-long advance. Hughes Tool Co.'s weekly count on August 10 put the country's active rig total at 4,116, and there are no indications we'll ever see the 3,000s again–this year, at least.

Nine states now have rig counts in triple figures, with Texas way out in front. Next, in order, are Oklahoma, Louisiana, Kansas, Wyoming, California, North Dakota, New Mexico, and Ohio. These nine states have a combined total of 3,480 active rigs, which is 143 rigs higher than the total for the entire country during the first week of 1981. The year-long average rig count stands at 3,734.

Rotary Rigs Actually Making Hole In United States & Canada

As Reported to International Association of Drilling Contractors by Hughes Tool Co.

	July 20, 1981	July 27, 1981	Aug. 3, 1981	Aug. 10, 1981
Alabama				
Land	20	18	15	19
Offshore	3	3	3	2
Total	23	21	18	[illegible]
Alaska				
Land	18	18	17	18
Offshore	3	2	2	2
Total	21	20	19	20
Arkansas	30	31	34	35
Arizona	2	2	2	2
California				
Land	138	139	139	141
Offshore	21	21	21	22
Total	159	160	160	163
Colorado	85	33	76	89
Florida				
Land	6	7	8	6
Offshore	2	2	2	2
Total	8	9	10	8
Georgia	1	0	1	0
Hawaii	1	1	1	1
Idaho	4	4	4	4
Illinois	30	32	32	32
Kansas	183	189	196	194
Kentucky	0	1	2	2
North Louisiana	69	67	64	65
South Louisiana				
Inland Waters	83	78	77	74
Land	155	145	152	159
Offshore	165	169	160	162
Total	472	459	453	460
Maryland	0	1	1	1
Michigan	32	32	34	38
Mississippi	62	66	67	72
Montana	65	77	88	88
Nebraska	18	20	22	20
Nevada	4	4	4	4
New Mexico	137	127	126	131
New York	17	17	17	18
North Dakota	148	128	126	134
Ohio	111	112	112	109
Oklahoma	705	704	712	715
Oregon	1	1	2	1
Pennsylvania	38	39	45	37
Rhode Island				
Offshore	1	2	1	2
South Dakota	2	3	4	3
Tennessee	1	0	0	0
Texas				
Offshore	68	71	71	70
Dist. 1	66	69	73	74
Dist. 2	72	55	67	74
Dist. 3	259	260	255	258
Dist. 4	117	133	122	123
Dist. 5 & 6	176	175	174	172
Dist. 7B	71	70	80	85
Dist. 7C	95	93	90	96
Dist. 8	177	169	175	183
Dist. 8A	95	85	100	89
Dist. 9	84	99	86	85
Dist. 10	71	69	69	72
Total	1351	1348	1362	1381
Utah	70	73	77	81
Virginia	2	6	6	6
Washington	2	2	2	2
West Virginia	48	50	50	48
Wyoming	193	185	188	193
Total U.S.	4027	4009	4054	4116
Western Canada	225	223	221	215
Eastern Canada	7	7	7	7
U.S. and Canada	4259	4239	4282	4338



PETROLEUM ENGINEER INTERNATIONAL • 800 Davis Building • Dallas, Texas 75202 • **TWX** 910-861-9306

Abbott Sparks	President
John G. Grant	Publisher and Vice President
W. B. Bleakley	Editor
Richard D. McNally	Associate Editor
Steven D. Moore	Technical Editor
Mary Jane Ellis	Assistant Editor
Laura Jacobus	Assistant Editor
Edna Taylor	Editorial Assistant
J. E. (Hank) Kastrop	Consulting Editor
Renn Rothrock, Jr.	Consulting Editor
Ernestine Adams	Editor, Energy Management Rpt.
Gregory Martin	Editor, Energy News/Energy Week
Sharon Hutcheson	Editorial Assistant

•

Brenda Hyde	Promotion
Alan Hilton	Service R&D Manager
Denise Tevis	Service R&D Department
Olga Dunn	Reader Service

ADVERTISING SALES OFFICES

EASTERN: Richard Martin, P. O. Box 89, Tennent, New Jersey 07763, (201) 446-3230

CHICAGO 60646: Dwain Holmgren 4761 West Touhy Ave., Lincolnwood, Illinois (312) 679-1100

OHIO, WESTERN PA.: Dwain Holmgren, 4761 West Touhy Avenue, Lincolnwood, Illinois (312) 679-1100

LOS ANGELES 91106: Bruce Berkey, 61 S. Lake Ave., Box 4566, Pasadena, Calif., (213) 681-0685

HOUSTON 77027: Jess Adkins, Vice Pres., Gulf Coast Regional Manager, **Barry Biklen, Hal Odum**, 4151 Southwest Freeway Suite 115, (713) 626-7850

DALLAS 75202: Ed Sealey, Rusty Meador, George Galloway, 800 Davis Bldg., (214) 748-4403, TWX 910-861-9306

WEST TEXAS: Rusty Meador, P. O. Box 611, Eldorado, Texas 76936 (915) 853-2689

UNITED KINGDOM, NETHERLANDS, SCANDINAVIA: Bryan Clark, Energy Publications Div. HBJ, 24/28 Oval Road, London NW1 7DX, England, (01) 485-7074 (OR 7075). Cable: HARBREX London NW1: Telex: 25775

FRANCE, ITALY, BELGIUM, SWITZERLAND: Gerard Lasfargues, 32, rue Desbordes Valmore, 75016-Paris, France, Telephone: 504 97 94

JAPAN: Mashy Yoshikawa, Orient Echo, Inc., 11th Floor Sankyo Bldg., 7-12 Tsukiji 2-chome, Chuo-ku, Tokyo, Telephone: 541-4923, Cable: MYORIENTECHO

GERMANY, AUSTRIA: S.I.P.A.S., **Wim. J. M. Sanders, Paul J. Verbunt**, Raadhuisstraat 24, P. O. Box 25, 1484 EN Graft-de Ryp, Holland, Telephone 02997-1303 and 3660. Telex: 13039 sipas nl, Telegrams: SIPAS-Amsterdam

Jane Dietz	Production Department Manager
Don Fickert	Graphics Director
Janell Fowler	Production Manager
Debbie Cooper	Production Coordinator
Dennis Howard	Presentation
Laura Page	Presentation
James Duke	Presentation
Victoria Valentin	Presentation

•

Gary Hogan	Business Manager
Jack Schabel	Circulation Director
Royal Courtney	Circulation Fulfillment Manager

EDITORIAL ADVISORY COMMITTEE

Lloyd E. Elkins, Petroleum Consultant
Bennie L. Franks, Senior Vice President, Reserves Management and Technology, Sun Production Co.
Dennis E. O'Brien, Technology Section Head, Exxon Chemical Company
B. R. Jones, President, Eagle Production and Drilling Co.
Frank Schuh, Director of Engineering Development, ARCO Oil and Gas Co., a Division of Atlantic Richfield Co.
Marius J. Mes, Senior Research Scientist, Production Research Department, Conoco Inc.

PETROLEUM ENGINEER INTERNATIONAL (USPS 429-380) published 15 times each year, monthly plus March 15, July 15 and November 15, by Energy Publications Division, Harcourt Brace Jovanovich, P.O. Box 1589, Dallas, Texas 75221.

September, 1981, Volume 53, No. 10. Copyright © 1981 by Harcourt Brace Jovanovich, Inc. All rights reserved. No part of this publication may be transmitted or reproduced in any form or by any means, electronic or mechanical, including photocopy, recording, or any information storage and retrieval system, without permission in writing from the publisher. Subscription rate to personnel employed by companies involved with exploration, drilling, production, or field processing of oil or gas: one year $12.00, two years $18.00, three years $24.00 for North, Central, and South America. Outside North, Central, and South America: one year $25.00, two years $35.00, three years $45.00. Subscription rate for all others: $25.00 for one year. Single copy price $3.00. Second class postage paid at Duluth, MN and additional mailing offices.

Microfilm copies are available through University Microfilms, International, 300 North Zeeber Road, Ann Arbor, Michigan 48101. Indexed by Applied Science, Technology Index and the Engineering Index, Inc.

Postmaster: Send address changes to PETROLEUM ENGINEER INTERNATIONAL, P.O. Box 1589, Dallas, Texas 75221, USA.

HBJ A HARCOURT BRACE JOVANOVICH PUBLICATION

ABP

ABC

HARCOURT BRACE JOVANOVICH PUBLICATIONS

ROBERT L. EDGELL, Chairman; RICHARD MOELLER, President; LARS FLADMARK, Executive Vice President; ARLAND HIRMAN, Treasurer; JOE BILDERBACH, Vice President; JAMES GHERNA, Vice President; GEORGE GLENN, Vice President; THOMAS GRENEY, Vice President; EZRA PINCUS, Vice President; HARRY RAMALEY, Vice President; ABBOTT SPARKS, Vice President. OFFICES: 757 Third Avenue, New York, N.Y. 10017. Phone (212) 888-4444; 1 East First Street, Duluth, Minnesota 55802. Phone (218) 727-8511. 111 East Wacker Drive, Suite 1730, Chicago, Ill. 60601. Phone (312) 938-2300.

ABOUT THE COVER: Unusual view of rig activity was snapped during a trip on a deep-drilling rig in the Rocky Mountain Overthrust Belt. (Photo courtesy of Brinkerhoff-Signal Inc.)

NEXT MONTH: Despite high costs and high taxes, development drilling is still going strong in the North Sea. The October issue will look at some of the challenges and problems.

Petroleum Engineer® INTERNATIONAL

The international magazine of methods for engineering/operating people

SEPTEMBER 1981 NUMBER 11 VOLUME 53

DRILLING TECHNOLOGY

Drilling Boom Takes On International Proportions 31
by Rich McNally, Associate Editor

How A Drilling Contractor Views Changing Trends 36
Exclusive interview with Bill R. Jones, Eagle Production and Drilling Services

Elf Drills More Than 1,000 Ft Horizontally 51
by Andre P. Jourdan, Elf-Aquitaine, and Guy A. Baron, Institut Français du Pétrole

How To Get The Most Out Of Your Drill String 65
by Morris E. Rowe and Gerald E. Wilson, Sii Drilco

Calculators Augment Drilling Programs – Part 5 81
by Ben Siegel, Technical Drilling Assistance

Drill Collar Perforator Helps Prevent Disaster 86
Staff Report

Preventive Maintenance Saves Equipment, Time, Money 93
by Jim Franklin, Moran Bros. Inc.

New Casing Jacking System Increases Rig Capacity 101
by George Boyadjieff and Roderick Abbott, Varco Oil Tools

Well Completions And Workovers – Part 17 116
by L. Douglas Patton, Keplinger Operating Co., and
W. A. Abbott, Great Eastern Energy and Development Corp.

Closed-Loop System Controls Mud Solids 132
by Richard C. Churchwell, Swaco Division, Dresser Industries Inc.

How To Select The Correct Hydraulic Hose Couplings 146
by Step Kahn, Gates Rubber Co.

Mud Pump Failure Analysis – Part 3 162
by Edwin C. Lewis II, Innovative Concepts

International Land Rig Locator R-1
Locations and specifications for 4,232 rotary rigs

EDITORIAL DEPARTMENTS

News Hi-lites 1
Significant Happenings in Petroleum

Course of Oil 6
20 Minutes Too Long

Technology Trends 8
Forecasts from Current Events

Offshore Technology 12
One-Piece Jacket in Deep Gulf

Continuous Tables 157

Drilling/Exploration 184
Variety of Rigs

Industry Meeting Calendar 202

Company News 204

Petroleum Profiles 212
Five Minutes with Carl Haskett

Book Reviews 228

Professional Directory 228

Index to Advertisers EM-24

ENERGY management report™

by Ernestine Adams

Comment EM 1

Energy World News EM 2

Second Quarter Report EM 4

Financial Notebook EM 8

Oil & Gas Professional Opportunities EM 9

Preventive Maintenance Saves Equipment, Time, And Money

by Jim Franklin, *Preventive Maintenance Superintendent, Moran Bros. Inc., Wichita Falls, Tex.*

Preventive maintenance in the drilling industry has become a necessity. New companies are being formed every day. These companies are building drilling rigs as fast as they can, which are immediately being put in service. The recent increase in drilling has placed tremendous demands and burdens on equipment and the people who maintain it. Parts to make repairs are no longer available; machine shops and overhaul agencies are overflowing with work. Therefore, it is essential that equipment be properly maintained.

The equipment failures in Figs. 1 through 3 are typical examples of things that every contractor has probably been faced with – equipment which has been damaged or ruined as the result of simple neglect or lack of experience. The increasing number of drilling rigs in operation also has created a serious shortage of experienced personnel. These shortages have led to early promotions, up to and including rig managers and drilling superintendents, which adds to the need for preventive maintenance.

In 1956, there were 2,689 drilling rigs available for contracting. This figure decreased to an all-time low in 1971, at a total of 1,000, and then began an increasing trend (Table 1). The statistics show the increase in drilling activity and provide some realization of the intense impact on the industry. These figures do not include the Soviet Union. The figures in Table 1 also show the need for increased emphasis on the condition of drilling equipment, availability of parts, quality of maintenance, etc.

Where To Start

One of the first programs necessary for proper preventive maintenance is an oil sampling program on engines. Samples should be taken at scheduled intervals, and by analyzing various wear metals, engine failures can often be detected prematurely. Even the part of the engine which is failing can sometimes be determined prior to disassembly, based on the type of wear metal in the sample.

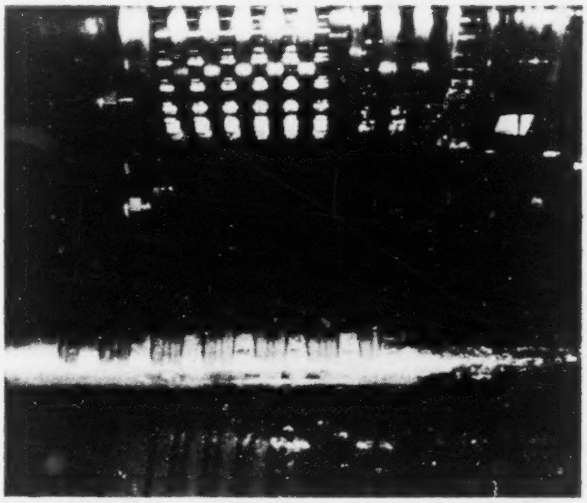


Fig. 1. The chain of this compound became so loose it began rubbing against the chain oiler–nearly wearing it in half.

As a result, the engine can be repaired at a lower cost than if it had been allowed to continue in use until actual failure.

Overheating engines is sometimes a problem which may be due to the misuse of corrosion inhibitor. Some contractors use a sodium chromate water system corro-

TABLE 1. Drilling statistics

Number of wells drilled in 1975, 1978, and 1985 (speculated)*

	1975	1978	1985
U.S.	38,387	49,887	63,603
International	9,543	12,985	21,883
Total	47,930	62,872	85,486

Number of feet of hole made*, in millions

	1975	1978	1985
U.S.	178.6	240	315.0
International	51.7	68	114.6
Total	230.3	308	429.6

*Made available through the University of Texas School of Rig Maintenance Technology

sion inhibitor, which is one of the best and most commonly used inhibitors. Chromate inhibitors, however, should not be used in permanent-type antifreeze solutions. Chromium hydroxide, commonly called green slime, can result from the use of chromate inhibitors with permanent-type antifreeze. This material deposits on the cooling system passages, reducing the heat transfer rate, and results in engine overheating. To correct the problem, engines will have to be chemically cleaned and flushed prior to reservicing with permanent antifreeze, but the overheating problem can be corrected.

Water Sampling

Another useful practice is a water sampling program – once each quarter water samples are taken from each radiator. This sample is chemically tested for the pH factor, nitrite level, and coolant concentration. From the results of this test, one can determine the amount of corrosion inhibitor which needs to be added. Corrosion inhibitors are incorporated into permanent-type antifreeze, and while freeze protection lasts indefinitely, the inhibitor quality is lost after approximately 90 days of operation. It is necessary, therefore, to add corrosion inhibitor on a quarterly basis.

Samples of raw water should be taken each time a rig moves to a new location and then taken to a chemical laboratory for analysis. The chemical makeup of some of these waters drawn from farm ponds, or even wells which are drilled on location, is simply not suitable for drilling rig applications. Some waters contain chemicals which will attack various types of metals, leaving behind heavy scale and corrosion; some will eat up drill pipe at an astonishing rate. But one would never know this if the waters were not tested.

Cut-off Program

With the deeper wells and heavier hook loads used today, cut-off procedures have become an important part of proper rig operations. The safety factor is, of course, the most important reason for ton mile calculation; however, wire rope which has been reduced in diameter will also result in excessive wear on the crown and traveling block sheaves. There is also the possibility of breaking a drilling line which has worn beyond its limits, which is extremely damaging to equipment, not to mention the safety of rig personnel. A proper cut-off program is designed and tailored differently for each specific rig, based on a number of various measurements and equipment sizes. It is designed to provide the longest life possible with regard to safety and reliability.

Inspection

A semiannual mud pump inspection is also recommended. Every 6 months, remove all of the inspection plates, recycle the oil, then, before returning the recycled oil to the pump, spray it and thoroughly flush it out with diesel fuel. Clean out the sludge and sediment, then inspect the gear end. Many minor discrepancies can be found and corrected during this inspection before they become major problems. Clean or replace oil filters and service pulsation dampeners if necessary during these inspections.

Many rigs have problems, during cold weather operations, with air lines and valves freezing up. Some of these problems result in very costly downtime. The contractor can install, on each rig, an independent deicing system in the air system. This deicer incorporates its own reservoir which contains a deicing fluid. This fluid is emitted into the air lines and keeps ice from forming through condensation. It is also a lubricator which keeps air valves properly lubricated, so it is recommended for year-round use. Through the use of this deicer, most freezing problems can be eliminated.

Equipment failure also can occur if a piece of equipment has been operated when it should not have been. Perhaps the oil had been drained or a component removed that would render it inoperable. Preprinted warning tags can be distributed to the rigs to help prevent these problems. When a piece of equipment should not be operated, a warning tag is placed on the controls, advising the operator of its condition.

A quarterly rig inspection can ward off many potential hazards – check the general condition of all equipment and initiate reports and recommendations to rig managers and management. Derricks and substructures should be inspected each year. This is best accomplished during a rig move when the derrick is lowered, so a more comprehensive inspection can be conducted. Annual inspections on all of the traveling equipment

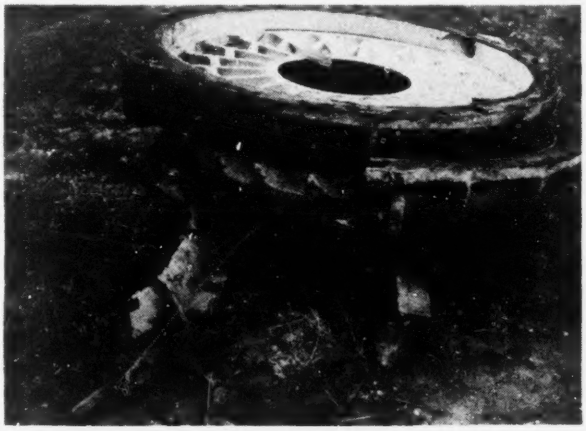


Fig. 2. This 40-in. double hydromatic brake froze and burst during cold weather operations. The brake is cooled by circulating water. However, in this case, the water was not treated with the proper coolant.

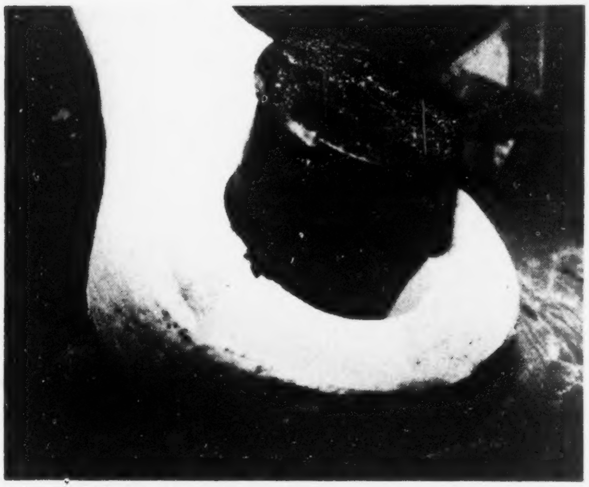


Fig. 3: This 120-ton swivel shows excessive wear on the bail where the bail is pinned – the wear far exceeds acceptable limitations.

and pipe handling equipment should include crown and traveling blocks, hooks, swivels, kelly bushings, master bushings, and drill collar clamps.

Other special inspections or projects will be dictated by management – there are always peculiarities which arise from time to time, away from the regularly scheduled actions, which require attention. Thorough reports should be made on all inspections. These reports should include recommendations for repair or a suggested course of action.

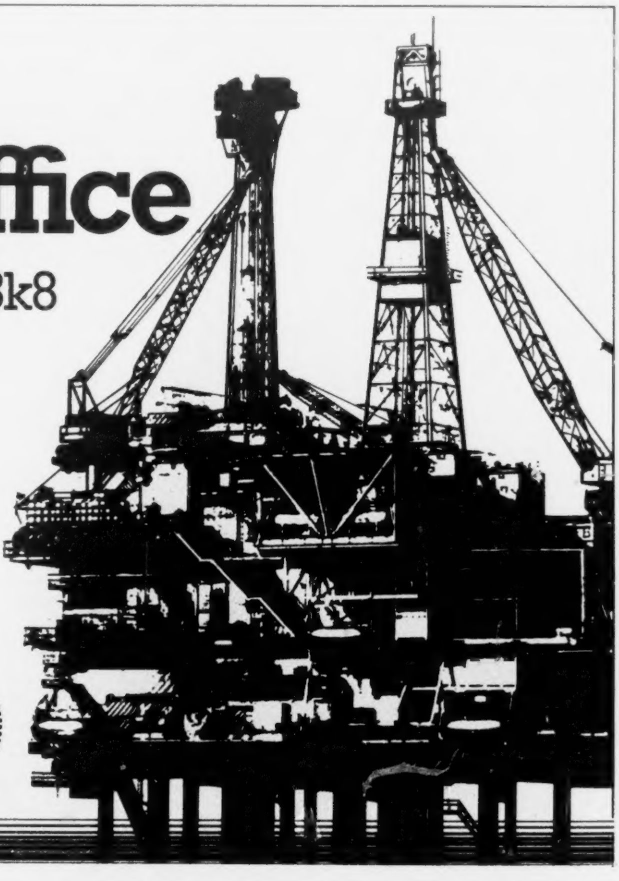
There is virtually no end to the preventive maintenance actions and programs that can be taken advantage of as related to a drilling rig. To begin with, one must believe in it, then attack the problems and objectives with a positive attitude.

The key to minimizing costly downtime and increasing the life of equipment is through a program of good, sound maintenance practices. We have attempted to standardize procedures, establish maintenance intervals, and insure that they are met; and ultimately reduce maintenance costs and downtime through prolonging equipment life.

About the Author

Jim Franklin is preventive maintenance superintendent for Moran Bros. Inc. in Wichita Falls, Tex. In this capacity, he develops maintenance programs for rigs in western Oklahoma, the Texas Panhandle, and southwest Texas.

Franklin joined Moran Bros. in September 1977, following a career in the Air Force. His Air Force career began in 1956 and took him all over the world, including overseas assignments in Okinawa and Vietnam. His duties included jet engines and aircraft maintenance, and he retired in 1977 as a technical sergeant. ■



Offshore Supplies Office

at Offshore Europe, Stand 3k8

The Department of Energy's Offshore Supplies Office will be at Offshore Europe, Aberdeen (15th — 18th September) and will welcome the opportunity of talking to you about current offshore oil and gas related activities.

Offshore Supplies Office, Alhambra House
45 Waterloo Street, Glasgow G2 6AS
Tel: Glasgow
(041) 221 8777
Telex: 779379.

OSO

rips
Lube S-40
smooth and
and makeup
ll work to prev
during opera
drill pipe
Rocker Lube
helps prolong
joint thread
ube
Compound C
Houston,
(713) 861-232
Lube
Sold at all
Emsco Supply Stores

Circle 254 on Reader Service Card

Double Eagle Gas Discovery

Double Eagle Petroleum and Mining Co. has a natural gas discovery 70 miles northwest of Casper in the Wind River Basin of central Wyoming.

The well, No. 2 Graham unit, flowed 2.5 MMcfd of gas and 60 b/d of condensate, no water, through a ⅛-in. choke with tubing pressure of 2,390 psi, for a calculated absolute open flow of 3.8 MMcfd. Production is from the Fort Union formation through perforations between 7,328 and 7,340 ft, 7,430 and 7,432 ft, and 8,540 and 8,560 ft.

The well is 1 mile north of nearest production in the Frenchie Draw field, which produces gas from the Fort Union formation but not from the same reservoir.

Cotton Petroleum Tests Gas in Texas

Cotton Petroleum Corp. has a high-flowing gas well in the Texas Panhandle.

The Weinette B No. 1 well, a northwest stepout to the May Basal Morrow field, was completed from the Upper Morrow sandstone with a calculated open flow rate of 7.8 MMcfd of gas. In production testing, the well flowed 4.1 MMcfd with a flowing tubing pressure of 1,426 psi from perforations between 9,263 and 9,278 ft.

Pioneer Gasser In Roger Mills County

Pioneer Production Corp's Hershberger No. 1-4 in Roger Mills County, Oklahoma, is completed in the Upper Morrow chert conglomerate formation from 16,364 to 16,389 ft, and is producing at a rate of 15.8 MMcfd of natural gas with a flowing tubing pressure of 1,200 psi.

World Rig Count Goes Monthly

The International Rotary Drilling Rig Report prepared by Hughes Tool Co., Houston, Tex., will be issued on a monthly basis from now on instead of quarterly. In addition, the report now breaks out offshore rigs.

The changes began with the report for the second quarter of 1981. In it, Hughes counted 1,024 land rigs and 338 offshore rigs for a total of 1,362 active rigs in the Free World. Adding U.S. and Canadian rigs as of the end of June gives a grand total of 5,588.

(continued on page 198)

International Rotary Drilling Rig Report

	June 1981			May 1981		June 1980	
Africa	**Land**	**Offshore**	**Total**	**Land**	**Offshore**	**Land**	**Offshore**
Algeria	98	0	98	98	0	113	0
Angola	0	4	4	0	4	1	4
Cameroun	0	8	8	0	8	0	4
Gabon	5	8	13	5	8	2	7
Libya	31	2	33	31	2	38	2
Morocco	4	0	4	4	0	1	1
Chad	1	0	1	1	0	1	0
Nigeria	15	5	20	15	5	15	5
Rep. of Congo	2	5	7	2	5	0	4
Rep. of Zaire	1	0	1	1	0	1	0
Tunisia	8	3	11	8	3	5	2
Niger	5	0	5	5	0	5	0
Ivory Coast	0	4	4	0	4	1	2
South Africa	0	2	2	0	2	1	1
Sudan	3	0	3	3	0	2	0
Total:	173	41	214	173	41	186	32

	June 1981			May 1981		June 1980	
Europe	**Land**	**Offshore**	**Total**	**Land**	**Offshore**	**Land**	**Offshore**
Austria	8	0	8	8	0	8	0
Belgium	0	0	0	0	0	1	0
Denmark	0	2	2	0	2	3	0
France	15	2	17	15	2	10	1
Germany	23	1	24	23	1	23	0
Greece	3	3	6	3	3	1	2
Holland	9	6	15	9	6	6	14
Italy	25	7	32	25	7	7	9
Norway	0	12	12	0	12	0	11
Portugal	1	0	1	1	0	0	0

Latin America is the leading drilling region listed in the report, with 509 rotary rigs–423 of them land rigs. Mexico, with more than 200 rigs, is the easy leader, finishing way ahead of Brazil, Argentina, and Venezuela.

In the Far East, Indonesia leads the way with 85 rigs–25 of them offshore. India is second and Burma is third. African drilling is led by Algeria. Libya is a distant second, and Nigeria, Gabon, and Tunisia are the only other countries in double figures.

Europe is credited with 209 rigs (90 offshore) and, after the U.K.'s 59 rigs, most of them are pretty well distributed among six or seven countries.

The Middle East rig count as of the end of June is 160, with Saudi Arabia, Abu Dhabi, Egypt, and Turkey accounting for most of them. The South Pacific, which in the Hughes report means Australia, New Zealand, and Papua New Guinea, is credited with 22 rigs, which represents a 22% increase over the previous month.

Union Oil Tests Thailand Wildcat

Union Oil Co. of California's Pladang No. 3 wildcat in the Gulf of Thailand tested at a combined rate of 31.1 MMcfd of natural gas and 1,099 b/d of condensate through ½-in. and ¾-in. chokes during four tests from zones between 5,402 and 7,758 ft.

The well is located approximately 5 miles southeast of Pladang No. 2, drilled earlier this year. The Pladang field is approximately 25 miles north of the Erawan field, which is to begin production this fall.

IMCO Increases Well Control Courses

IMCO Services, Houston, Tex., has increased the frequency of BOSS training service well-control refresher courses it offers from once a month to twice a month.

The basic course runs 4 to 5 days. On request, IMCO will conduct refresher courses for customers at their company sites for groups of 8 to 10 persons.

Seismic Count Nears Record

The total number of seismic land crews and marine vessels searching for oil and gas in the U.S. and U.S. waters took another dramatic step upward during June to come within four crews of the 700 mark.

The Society of Exploration Geophysicists says the June total was 696, up from 661 in May. The 696 figure is within 14 crews of the all-time high of 710 reached in October 1952.

Switzerland	1	0	1	1	0	1	0
Spain	8	2	10	8	2	5	7
United Kingdom	4	55	59	4	55	2	48
Yugoslavia	22	0	22	22	0	22	0
Total:	119	90	209	119	90	89	92

	June 1981			May 1981		June 1980	
Far East	**Land**	**Offshore**	**Total**	**Land**	**Offshore**	**Land**	**Offshore**
Bangladesh	5	0	5	5	0	2	0
Brunei	1	6	7	1	6	2	6
Burma	31	0	31	31	0	24	0
India	37	7	44	37	7	36	6
Indonesia	60	25	85	60	25	58	19
Japan	15	2	17	15	2	13	3
Korea	0	0	0	0	0	0	0
Malaysia	0	13	13	0	13	1	10
North Korea	0	0	0	0	0	0	1
Pakistan	16	0	16	16	0	12	0
Philippines	8	3	11	8	3	10	3
Thailand	2	5	7	2	5	1	3
Taiwan	11	1	12	11	1	10	2
Vietnam	0	0	0	0	0	0	1
Total:	186	62	248	186	62	169	54

	June 1981			May 1981		June 1980	
Latin America	**Land**	**Offshore**	**Total**	**Land**	**Offshore**	**Land**	**Offshore**
Argentina	65	3	68	76	2	71	1
Bolivia	10	0	10	11	0	4	0
Brazil	52	31	83	48	31	38	38
Central America	5	0	5	5	0	3	0
Chile	3	4	7	3	4	4	2
Colombia	16	0	16	25	0	13	1
Ecuador	3	0	3	4	0	3	0
Mexico	197	20	217	197	20	193	23
Peru	18	5	23	18	5	15	5
Trinidad	8	6	14	8	6	8	6
Venezuela	46	17	63	45	17	38	16
Total:	423	86	509	440	85	390	92

	June 1981			May 1981		June 1980	
Middle East	**Land**	**Offshore**	**Total**	**Land**	**Offshore**	**Land**	**Offshore**
Abu Dhabi	10	18	28	10	18	5	19
Bahrain	1	0	1	1	0	1	0
Dubai	0	2	2	0	2	1	2
Egypt	11	16	27	11	16	10	17
Iran		No report			No report		
Iraq	5	0	5	5	0	39	0
Kuwait	3	0	3	3	0	3	0
Neutral Zone			Included in Saudi Arabia				
Oman	9	0	9	9	0	8	0
Qatar	4	4	8	4	4	4	4
Ras Al Khaimah	1	0	1	1	0	1	0
Saudi Arabia	16	15	31	16	15	15	10
Sharjah	1	1	2	1	1	1	0
Syria	16	0	16	16	0	15	0
Turkey	26	0	26	26	0	7	0
Umm Al Qaiwain	1	0	1	1	0	0	0
Total:	104	56	160	104	56	110	52

	June 1981			May 1981		June 1980	
South Pacific	**Land**	**Offshore**	**Total**	**Land**	**Offshore**	**Land**	**Offshore**
Australia	19	2	21	11	3	10	7
New Zealand	0	1	1	3	1	1	0
Papua New Guinea	0	0	0	0	0	1	0
Total:	19	3	22	14	4	12	7
Grand Totals:	**1,024**	**338**	**1,362**	**1,036**	**338**	**956**	**329**

Second Quarter Report

Downstream Operations Limit Earnings

by Greg Martin, *Editor, ENERGY NEWS/ENERGY WEEK*

Refining and marketing operations improved over first quarter, but not enough. That was the common theme of integrated companies' earnings reports in second quarter.

Greater income from exploration/production in first half of 1981 was offset by lower margins on downstream business. As a group, the 74 oil companies in our survey showed a 4.7% decline in net income from first half of 1980. Profit margin for the group fell from 6.4% to 5.4%.

Higher prices for U.S. crude oil after decontrol in January, and for natural gas under phased decontrol, lifted earnings of independent producers, though "windfall profits" tax eliminated much of the gain on crude production.

Domestic production made U.S. earnings better than foreign earnings for international operators. Also, strengthening of the U.S. dollar against other currencies resulted in lower margins in foreign countries when expressed in dollars.

Excluding currency translation gains of $588 million (compared to losses of $368 million in second quarter 1980), Exxon's worldwide earnings fell 13.3% from 1980 because of lower margins on refined products and a 15% decline in sales. U.S. refining/marketing in first half 1981, though better than operations abroad, lost $20 million, compared to $147 million profit in same 1980 period.

Shell Oil showed big gain in exploration/production earnings in first half, but downstream earnings fell and overall income remained flat. Standard California's U.S. oil/gas earnings were up 81% but overall net was

FIRST HALF GAS COMPANY FINANCIAL REPORTS

	Three months ending June 30**						Six months ending June 30**						Profit△ Margin	
	Revenues ($000)			Earnings* ($000)			Revenues ($000)			Earnings* ($000)				
Company	1981	1980	% Chg.	1981	1980	% Chg.	1981	1980	% Chg.	1981	1980	% Chg.	1981	1980
Alabama Tennessee N.G.	27,065	20,124	+ 34.5	1,313	1,311	+ 0.2	106,134[3]	86,877[3]	+ 22.2	5,583[3]	5,154[3]	+ 8.3	5.3	5.9
American Nat. Resources	590,044	459,770	+ 28.3	23,788	16,524	+ 44.0	1,479,146	1,244,981	+ 18.8	85,042	70,684	+ 20.3	5.7	5.7
Arkansas Louisiana Gas	302,421	242,061	+ 24.9	32,602	22,376	+ 45.7	1,088,217[3]	903,349[3]	+ 20.5	82,185[3]	78,320[3]	+ 4.9	7.6	8.7
Coastal Corp.	1,414,706	1,116,527	+ 26.7	(37,494)	28,590		3,186,108	2,562,891	+ 24.3	(24,155)	54,981			2.1
Columbia Gas	862,677	739,542	+ 16.7	31,423	30,629	+ 2.6	2,302,498	2,041,924	+ 12.8	114,617	113,107	+ 1.5	5.0	5.5
Commonwealth Nat. Res.	56,191	40,458	+ 38.9	1,267	1,041	+ 21.7	133,037	110,665	+ 20.2	4,242	4,165	+ 1.9	3.2	3.8
Consolidated N.G.	524,518	464,856	+ 12.8	22,171	11,067	+100.3	1,567,560	1,418,062	+ 10.5	93,389	81,070	+ 15.2	6.0	5.7
El Paso Companies†	1,007,000	898,000	+ 12.1	37,772	6,131	+516.1	2,008,000	1,737,000	+ 15.6	68,676	40,879	+ 68.0	3.4	2.4
ENSERCH Corp.	821,566	617,744	+ 33.0	46,197	31,169	+ 48.2	1,656,408	1,312,431	+ 26.2	102,120	73,801	+ 38.4	6.2	5.6
Houston N.G.[1]	732,963	603,418	+ 21.5	59,478	56,031	+ 6.2	1,452,440	1,190,050	+ 22.0	121,285	105,326	+ 15.2	8.4	8.9
Internorth	737,980	603,871	+ 22.2	39,305	42,722	- 8.0	1,880,595	1,542,267	+ 21.9	155,667	153,187	+ 1.6	8.3	9.9
Mountain Fuel Supply	113,743	95,863	+ 18.7	7,168	7,219	- 0.7	260,300	224,888	+ 15.7	21,743	22,169	- 1.9	8.4	9.9
National Fuel Gas	174,883	135,965	+ 28.6	841	(1,499)		755,137[4]	625,623[4]	+ 20.7	30,495[4]	21,502[4]	+ 41.8	4.0	3.4
Northwest Energy	287,178	283,770	+ 1.2	14,169	10,741	+ 31.9	715,878	715,298	+ 0.1	37,166	28,8[illegible]	+ 28.9	5.2	4.0
ONEOK Inc.	261,049	205,506	+ 27.0	12,051	9,300	+ 29.6	594,926	485,712	+ 22.5	33,291	30,231	+ 10.1	5.6	6.2
Pacific Lighting	803,948	663,109	+ 21.2	33,596	22,855	+ 47.0	1,593,811	1,435,245	+ 11.0	74,223	45,5[illegible]5	+ 62.9	4.7	3.2
Panhandle Eastern	844,428	550,282	+ 53.5	78,961	37,405	+112.0	1,723,382	1,207,469	+ 42.7	156,759	97,828	+ 60.2	9.1	8.1
Peoples Energy	700,212	671,286	+ 4.3	24,610	25,700	- 4.2	1,934,898	1,747,148	+ 10.7	113,380	91,942	+ 23.3	5.9	5.3
Pioneer Corp.	308,022	234.788	+ 31.2	28,401	22,390	+ 26.8	596,177	445,271	+ 33.9	57,599	45,820	+ 25.7	9.7	10.3
Southern Nat. Res.	623,444	400,516	+ 55.7	37,996	30,748	+ 23.6	1,301,498	954,298	+ 36.4	85,344	67,798	+ 25.9	6.6	7.1
Southern Union Co.	239,173	218,914	+ 9.3	8,568	8,186	+ 4.7	557,465	475,877	+ 17.1	27,832	25,839	+ 7.7	5.0	5.4
Texas Eastern Corp.	1,017,967	1,057,379	- 3.7	59,915	55,569	+ 7.8	2,172,514	2,144,090	+ 1.3	122,523	116,827	+ 4.9	5.6	5.4
Texas Gas Trans.	590,366	511,124	+ 15.5	28,315	18,837	+ 50.3	1,273,530	1,096,457	+ 16.1	59,943	43,910	+ 36.5	4.7	4.0
Texas Oil & Gas[2]	296,062	216,432	+ 36.8	50,570	37,250	+ 35.8	1,149,402[4]	866,497[4]	+ 32.6	138,809[4]	101,292[4]	+ 37.0	12.1	11.7
TransCanada PipeLines							1,797,576	1,516,076	+ 18.6	64,314	47,322	+ 35.9	3.6	3.1
Transco Companies	931,973	601,327	+ 55.0	31,085	27,228	+ 14.2	1,797,163	1,187,562	+ 51.3	62,471	55,586	+ 12.4	3.5	4.7
United Energy Res.	1,277,800	929,401	+ 37.5	53,908	37,096	+ 45.3	2,541,876	1,964,183	+ 29.4	109,312	78,798	+ 38.7	4.3	4.0
TOTAL	15,547,379	12,582,033	+ 23.6	727,976	596,616	+ 22.0	37,625,676	31,242,191	+ 20.4	2,004,055	1,701,929	+ 17.8	5.3	5.4

**Excluding non-recurring items. *Earnings available to common stock. △Ratio = Earnings ÷ Revenues. [1]Ends April 30. [2]Ends May 31. [3]Twelve months. [4]Nine months. †1980 earnings reflect loss from discontinued LNG operations. ()Loss held down by lower margins on foreign refining/marketing.

Gulf Oil's worldwide losses from downstream business, excluding Gulf Canada Ltd., totaled $212 million in first half 1981, compared to $476 million profit in same 1980 period.

Despite much higher income from oil/gas and sulfur production, Pennzoil's net income continued to fall from 1980 levels because of lower product margins. Lower margins also caused decline for Marathon Oil.

Coastal Corp. posted net loss in second quarter as worldwide refining/marketing losses of $73.9 million more than offset higher profits on oil/gas production, gas pipelining and coal operations.

Dorchester Gas had big gains in production earnings, but unprofitable refining operations led to an overall decline. Same factor caused decline for Crystal Oil, which also cited higher interest rates – "almost twice what would be expected, given the improvement in inflation measures."

FIRST HALF OIL COMPANY FINANCIAL REPORTS

		Three months ending June 30**						Six months ending June 30**						Profit Margin†	
		Revenues ($000)			Earnings* ($000)			Revenues ($000)			Earnings* ($000)				
		1981	1980	% Chg.	1981	1980	% Chg.	1981	1980	% Chg.	1981	1980	% Chg.	1981	1980
1.	Adams R&E	53,435	57,394	- 7.4	(3,231)	(1,945)		119,174	119,705	- 0.4	(5,525)	(3,043)			
2.	Adobe Oil	43,356	40,170	+ 7.9	6,004	5,264	+ 14.1	82,661	79,391	+ 4.1	11,160	10,332	+ 8.0	13.5	13.0
3.	Amcole Energy	899	565	+ 59.1	25	(188)		2,712[4]	1,453[4]	+ 86.6	[illegible]	(434)[4]		5.6	
4.	Alaska Interstate	80,330	61,512	+ 30.6	6,284	18,063	-187.4	171,608	118,247	+ 45.1	[illegible]	28,901	- 16.2	14.1	24.4
5.	American Petrofina	713,724	494,147	+ 44.4	15,251	25,123	- 39.3	1,380,198	1,017,521	+ 35.6	[illegible]	56,533	- 37.2	2.6	5.6
6.	American Quasar	14,403	11,753	+ 22.5	814	1,395	- 41.6	28,119	21,838	+ 28.8	[illegible]	3,637	- 56.0	5.7	16.6
7.	Ashland Oil	2,516,913	2,121,931	+ 18.6	3,796	40,768	- 90.7	4,883,005	4,162,090	+ 17.3	[illegible]	83,030	- 94.6	0.1	2.0
8.	Atlantic Richfield	6,968,034	5,667,450	+ 22.9	380,106	436,416	- 12.9	14,100,354	11,128,626	+ 26.7	[illegible]	863,433	- 15.8	5.2	7.8
9.	Beard Oil	9,216	4,948	+ 86.3	1,416	1,207	+ 17.3	16,267	10,657	+ 52.6	[illegible]	2,410	+ 3.5	15.3	22.6
10.	Brock Exploration	1,296	1,174	+ 10.4	(232)	55									
11.	Cities Service	2,208,500	1,814,300	+ 21.7	90,500	107,000	- 15.4	4,484,100	3,986,300	+ 12.5	148,200	277,100	-46.5	3.3	7.0
12.	Clark O&R	432,382	431,167	+ 0.3	13,008	11,246	+ 15.7	863,090	833,441	+ 3.6	8,539	25,346	- 66.3	1.0	3.0
13.	Consolidated O&G	12,813	8,317	+ 54.1	1,711	(384)		24,350	16,458	+ 48.0	3,693	(290)		15.2	
14.	Conoco Inc.	4,916,600	4,657,300	+ 5.6	158,700	249,600	- 36.4	10,312,800	8,987,300	+ 14.7	409,600	578,200	- 29.2	4.0	6.4
15.	Crown Central	380,785	331,891	+ 14.7	3,915	3,404	+ 15.0	758,613	635,445	+ 19.4	(6,313)	14,882			2.3
16.	Crystal Oil	83,635	60,491	+ 38.3	1,598	1,758	- 9.1	159,509	118,812	+ 34.3	25	4,645	- 99.5	--	3.9
17.	Diamond Shamrock	786,281	744,768	+ 5.6	(43,448)	56,346		1,623,830	1,459,521	+ 11.3	4,589	112,601	- 95.9	0.3	7.7
18.	Dorchester Gas[1]	166,418	135,493	+ 22.8	7,583	8,882	- 14.6	318,292	310,271	+ 2.6	14,214	16,465	- 13.7	4.5	5.3
19.	Dyco Petroleum	12,197	7,317	+ 66.7	3,594	1,919	+ 87.3	22,776	13,713	+ 66.1	6,550	3,530	+ 85.6	28.8	25.7
20.	Equity Oil	6,835	3,666	+ 86.4	1,736	948	+ 83.1	12,441	6,970	+ 78.5	2,887	1,789	+ 61.4	23.2	25.7
21.	Exxon	27,469,000	26,223,000	+ 4.8	1,825,000	1,030,000	+ 77.2	57,792,000	53,877,000	+ 7.3	3,425,000	2,955,000	+ 15.9	5.9	5.5
22.	Felmont	17,178	14,940	+ 14.8	3,297	4,201	- 21.5	36,225	26,888	+ 34.7	8,634	7,950	+ 8.6	23.8	29.6
23.	Forest	34,900	21,863	+ 59.6	946	538	+ 75.8	65,994	43,327	+ 52.3	3,228	2,661	+ 21.3	4.9	6.1
24.	Getty Oil	3,216,549	2,643,318	+ 21.7	204,775	242,887	- 15.7	6,511,170	4,912,017	+ 32.6	434,705	468,435	- 7.2	6.7	9.5
25.	Gulf Energy & Develop.	14,112	10,935	+ 29.1	1,726	1,884	- 8.4	28,181	19,801	+ 42.3	3,289	3,397	- 3.2	11.7	17.2
26.	Gulf Oil Corp.	7,200,000	6,794,000	+ 5.9	311,000	470,000	- 33.8	15,074,000	14,547,000	+ 3.6	614,000	859,000	- 28.5	4.1	5.9
27.	Helmerich & Payne	81,326	52,060	+ 56.2	20,297	12,054	+ 68.4	157,316	105,539	+ 49.1	39,001	23,984	+ 62.6	24.8	22.7
28.	Holly Corp.[2]	93,725	112,568	- 16.7	382	3,376	- 88.7	190,129	213,287	- 10.9	1,769	6,274	- 71.8	0.9	2.9
29.	Inexco Oil	61,694	35,977	+ 71.5	8,447	5,602	+ 50.8	114,592	67,697	+ 69.3	14,792	11,349	+ 30.3	12.9	16.8
30.	KRM Petroleum	1,382	1,194	+ 15.7	244	185	+ 31.9	2,734	2,402	+ 13.8	498	575	- 13.4	18.2	23.9
31.	Kerr-McGee Corp.	890,812	854,246	+ 4.3	51,445	49,577	+ 3.8	1,806,938	1,634,640	+ 10.5	94,782	96,719	- 2.0	5.2	5.9
32.	Lear Petroleum	38,903	19,624	+ 98.2	356	1,714	- 79.2	105,072[4]	65,547[4]	+ 60.3	5,745[4]	5,340[4]	+ 7.6	5.5	8.1
33.	Louisiana L&E	298,141	258,436	+ 15.4	41,655	42,832	- 2.7	620,943	523,390	+ 18.6	92,217	94,425	- 2.3	14.9	18.0
34.	Mapco Inc.	505,373	450,799	+ 12.1	29,009	40,165	- 27.8	1,085,394	829,610	+ 30.8	54,444	71,461	- 23.8	5.0	8.6
35.	Marathon Oil	2,133,752	2,039,893	+ 4.6	86,602	108,325	- 20.1	4,557,850	4,305,261	+ 5.9	156,377	247,396	- 36.8	3.4	5.7
36.	Marion Corp.	110,576	137,253	- 19.4	(1,550)	4,956		228,462	237,105	- 3.6	3,668	8,953	- 59.0	1.6	3.8
37.	May Petroleum	10,494	5,757	+ 82.3	1,922	1,224	+ 57.0	19,751	11,083	+ 78.2	4,562	2,577	+ 77.0	23.1	23.3
38.	Maynard Oil	11,015	7,633	+ 44.3	1,613	1,245	+ 29.6	20.997	14,399	+ 45.8	3,929	2,276	+ 72.6	18.7	15.8
39.	McMoRan Oil & Gas	45,498	22,009	+106.7	10,775	6,792	+ 58.6	102,975	40,061	+ 157.0	24,629	12,062	+104.2	23.9	30.1
40.	Mesa Petroleum	100,911	94,949	+ 6.3	26,074	24,652	+ 5.8	204,535	201,880	+ 1.3	55,915	44,565	+ 25.5	27.3	22.1
41.	Mobil Corp.	16,600,000	15,400,000	+ 7.8	700,000	688,000	+ 1.7	33,700,000	30,700,000	+ 9.8	1,340,000	1,534,000	- 12.6	4.0	5.0
42.	Moran Energy	22,749	15,131	+ 50.3	4,541	2,630	+ 72.7	42,713	28,801	+ 48.3	8,908	4,830	+ 84.8	20.9	16.8
43.	Murphy Oil	660,021	454,838	+ 45.1	44,995	35,633	+ 26.3	1,326,827	1,024,083	+ 29.6	83,425	64,023	+ 30.3	6.3	6.3
44.	Natomas	370,276	336,676	+ 10.0	57,557	57,399	+ 0.3	735,706	626,796	+ 17.4	115,794	105,414	+ 9.8	15.7	16.8
45.	Noble Affiliates	93,402	67,265	+ 38.8	18,341	12,090	+ 51.7	180,905	134,849	+ 34.2	36,391	25,549	+ 42.4	20.1	18.9
46.	Nugget Oil Corp.[3]	464,315	388,146	+ 19.6	119,094	126,102	- 5.5	1,554,894[5]	1,265,861[5]	+ 22.8	249,902[5]	523,879[5]	- 52.3	16.1	41.4
47.	Pacific Resources	233,347	179,983	+ 29.6	2,793	4,871	- 42.7	464,729	386,943	+ 20.1	1,413	13,901	- 89.8	0.3	3.6
48.	Patrick Petroleum	31,033	13,347	+132.5	3,344	1,049	+218.8	78,728	42,341	+ 85.9	6,234	1,035	+502.3	7.9	2.4
49.	Peninsula Resources	5,522	3,512	+ 57.2	278	260	+ 6.9	10,671	6,852	+ 55.7	533	405	+ 31.6	5.0	6.0
50.	Pennzoil Co.	672,115	630,996	+ 6.5	57,981	76,542	- 24.2	1,360,103	1,243,901	+ 9.3	117,104	159,043	- 26.4	8.6	12.8
51.	Petroleum Development	3,199	4,876	- 34.4	258	350	- 26.3	6,464	8,364	- 22.7	614	840	- 26.9	9.5	10.0
52.	Phillips Petroleum	4,072,955	3,230,179	+ 26.1	229,767	214,849	+ 6.9	8,301,424	6,614,341	+ 25.5	500,551	499,263	+ 0.3	6.0	7.6
53.	Quaker State	219,919	200,891	+ 9.5	7,367	7,496	- 1.7	438,076	395,751	+ 10.7	11,003	14,375	- 23.5	2.5	3.6
54.	Sabine Corp.	42,992	30,253	+ 42.1	7,422	5,504	+ 34.8	85,435	58,328	+ 46.4	16,035	11,853	+ 35.3	18.8	20.3
55.	Seneca Oil	3,101	895	+247.0	927	16	+5611.0	5,812	2,730	+113.0	1,260	339	+271.0	22.0	12.0
56.	Shell Oil	5,554,000	4,895,000	+ 13.5	410,000	407,000	+ 1.4	10,967,000	9,693,000	+ 13.1	771,000	780,000	- 1.2	7.0	8.0
57.	Southland Royalty	104,647	67,060	+ 35.9	10,423	2,536	+ 75.7	200,327	129,730	+ 35.2	20,410	7,966	+ 61.0	10.2	6.1
58.	Southwestern Energy	11,026	8,931	+ 23.5	2,335	1,819	+ 28.4	32,033	26,929	+ 19.0	7,853	6,164	+ 27.4	24.5	22.9
59.	Standard California	10,979,000	10,649,000	+ 3.1	616,000	535,000	+ 15.1	22,967,000	21,096,000	+ 8.9	1,282,000	1,162,000	+ 10.3	5.6	5.5
60.	Standard Ohio	2,907,900	2,840,600	+ 2.4	478,700	451,300	+ 6.1	6,027,200	5,499,300	+ 10.0	999,100	902,000	+ 10.8	16.6	16.4
61.	Statex Petroleum[3]	2,356	1,596	+ 46.3	333	317	+ 4.9	4,840	2,839	+ 70.5	922	503	+ 83.1	19.0	17.7
62.	Sun Co.	3,900,000	3,000,000	+ 30.0	298,000	247,000	+ 20.7	7,900,000	6,100,000	+ 29.5	418,000	498,000	- 16.1	5.3	8.2
63.	Superior Oil	504,181	350,618	+ 43.8	99,295	68,635	+ 44.7	997,087	680,905	+ 46.4	207,255	137,001	+ 51.3	20.8	20.1
64.	Supron Energy	19,612	16,191	+ 21.1	5,160	4,625	+ 11.6	37,473	31,247	+ 19.9	10,121	9,235	+ 8.5	27.0	29.8
65.	Tenneco	3,776,000	3,201,000	+ 18.0	203,000	186,000	+ 9.1	7,585,000	6,517,000	+ 16.4	397,000	364,000	+ 9.1	5.2	5.6
66.	Texaco	14,799,000	12,537,300	+ 18.0	555,700	502,900	+ 10.5	30,258,400	25,786,200	+ 17.3	1,213,700	1,103,500	+ 10.0	4.0	4.3
67.	Tosco	866,915	598,264	+ 44.9	12,072	23,983	- 49.7	1,629,344	1,132,426	+ 43.9	(26,616)	46,6[illegible]2			4.1
68.	Transcontinental Energy	23,977	18,777	+ 27.7	2,981	174	+1613.2	46,421	36,767	+ 26.3	6,100	168	+3531.0	13.1	0.5
69.	Tribune Oil	657	465	+ 41.3	208	141	+ 47.5	1,220	937	+ 30.2	372	332	+ 12.0	30.5	35.4
70.	Union California	2,685,800	2,648,000	+ 1.4	207,900	194,800	+ 6.7	5,280,100	4,930,300	+ 7.1	362,400	347,700	+ 4.2	6.9	7.1
71.	Universal Resources	15,442	9,626	+ 60.4	3,513	1,638	+114.4	29,587	18,913	+ 56.4	6,321	2,846	+122.1	21.4	15.0
72.	Wilshire Oil of Texas	4,330	3,173	+ 36.5	1,402	672	+108.6	8,119	6,003	+ 35.2	2,205	1,425	+ 54.7	27.2	23.7
73.	Wiser Oil	16,528	14,949	+ 10.5	4,625	3,315	+ 39.5	33,440	30,061	+ 11.2	9,884	8,351	+ 18.3	29.6	27.8
74.	Woods Petroleum	16,055	12,880	+ 24.7	4,074	3,311	+ 23.0	32,432	24,848	+ 30.5	8,741	6,377	+ 37.1	27.0	25.7
TOTAL		131,425,765	118,286,626	+ 11.1	7,443,531	6,887,043	+ 8.1	270,418,667	238,989,039	+ 13.2	14,619,814	15,346,395	- 4.7	5.4	[illegible]

**Excluding non-recurring items. *Earnings available to common stock. †Earnings* divided by Revenues. [1]Ends May 31. [2]Ends January 31. [3]Ends April 30. [4]Nine months. [5]Twelve months. ()Loss.

Second Quarter Report

Clark Oil, Tosco and Pacific Resources all turned first quarter losses into second quarter profit as crude oil prices dropped about $3/bbl during second quarter and companies were able to recover more raw material and operating costs. Tosco said its ability to refine lower quality, less expensive crude strengthened refining margins.

Net income for Ashland Oil and Quaker State continued to drop from 1980 levels. Ashland said it is reducing higher priced inventories as crude oil prices are moderating.

Wooed and (at this writing) apparently won by DuPont Co. largely because of its coal reserves, Conoco attributed its decline in second quarter income mainly to a strike by United Mine Workers, which resulted in loss of $51.5 million on coal operations, compared to $37 million profit in second quarter 1980.

Exxon paid $1.16 billion of "windfall profits" tax alone in first half 1981. Other WPT totals: Standard Ohio, $813.3 million; Atlantic Richfield, $833 million; Shell Oil, $773 million; Standard California, $678 million; Texaco, $639.2 million; Gulf, $634 million; Mobil, $524 million.

Non-utility operations continued to lead gains in net income for large gas companies. Earnings for the survey group rose respectably in both second quarter and first half 1981.

Higher profits from oil/gas production led to first half improvement for Consolidated Natural Gas. Gas sales to industry have improved.

Exploration/production was largest income producer for ENSERCH in second quarter and oilfield services again showed biggest gain. Gas sales and income for Lone Star utility division rose because of greater sales to electric utilities and industry.

United Energy Resources' higher income levels reflected more gas sales at higher prices and stronger contract drilling operations.

Contract drilling has shown greatest percentage increase in profitability among ONEOK's subsidiaries.

Non-utility segments were source of earnings gains for Southern Union, more than offsetting lower earnings from gas utility operations.

All-time high results for Texas Oil & Gas were due to higher gas gathering volumes, higher levels of production and prices for company-owned gas, and good contract drilling results.

All operations for Texas Gas Transmission – pipeling, oil/gas production, trucking, inland waterways – were higher than in same 1980 period.

Higher utility earnings were chief factor in Pacific Lighting's first half improvement.

First half earnings for InterNorth were flat and second quarter earnings fell from same 1980 quarter. Business recession hurt gas sales, petrochemical and liquid fuels operations.

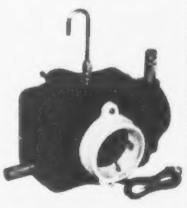
Lower than normal industrial activity also caused lower gas sales for Alabama-Tennessee.

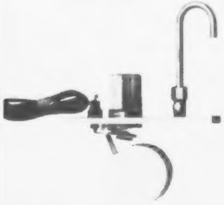
Mountain Fuel Supply's first half earnings dropped from 1980 mainly because of less profitable utility operations. Oil exploration/production showed substantial gains.

CONTROL TIPS

AUTOMATICALLY MAINTAIN SAFE CRANKCASE LEVELS.

LR-900 LR-900EX LR-557





Listed

Automatically adds the proper amount of oil to your crankcase without shutting down the engine. Model LR-900 is recommended for use on any vented or non-vented crankcase. A metering device allows only the proper amount of oil to flow into the crankcase and features a safety switch to shut down the engine if the supply tank is depleted. The LR-557 is designed to keep proper levels in McCord and similar lubricators.
PAT. NO. 4038507

HIGH PRESSURE LIQUID LEVEL FLOAT SWITCH.

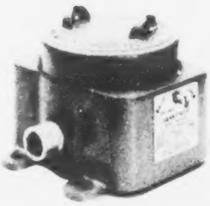
L-1200/L-1200N
FLOAT SWITCH

Listed

The L-1200 Float Switch is designed for level control on compressor scrubbers, pressure vessels, heater treaters, boilers or any process requiring liquid level monitoring. A rugged and dependable Snap Action, Float Actuated Level Switch, the L-1200 is designed especially to offer compact liquid level monitoring for medium to high pressure applications requiring "explosion proof" construction. All moving parts which come in contact with fluid are made of stainless steel to resist corrosion. Pneumatic Models combine same features with snap acting pilot valve
pat. no. 3970099

VIBRATION SWITCH DETECTS SEVERE EQUIPMENT OSCILLATION.

VS-2-EX
VIBRATION
SWITCH



Listed

This vibration and shock switch is sensitive to abnormal oscillation in three planes of motion and easily adjustable to detect any degree of abnormal vibration from heavy shocks — which occur if couplings parted on a pumping unit, to minute vibrations found on high frequency equipment.

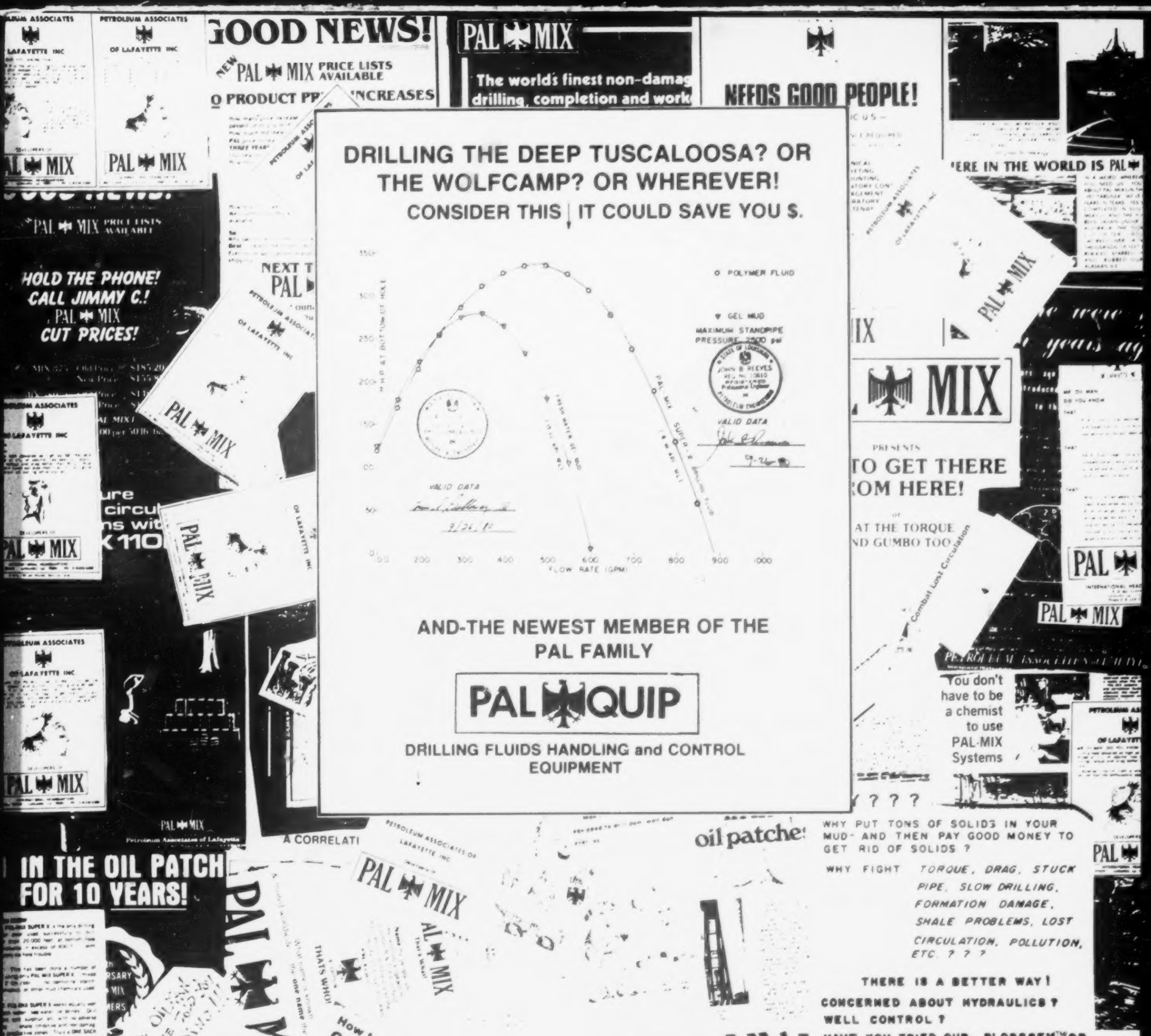
The magnetic latching feature assures virtually no wear on the internal tripping mechanism. Whenever acceleration of the equipment exceeds the holding force of the magnet, the latching member is released and D.P.D.T. contacts, rated 5 amps at 480 V AC, are transferred. Pneumatic Model (VS-2-N) vents 20-80 psi supply for equipment shutdown.
PAT. NO. 3641290/3967493

FRANK W. murphy MFR., INC.

FRANK W. MURPHY MANUFACTURER INC.
MURPHY SOUTHERN DIVISION
MURPHY SAFETY SWITCH OF CALIFORNIA
FRANK W. MURPHY LIMITED

P.O. Box 45248, Tulsa, Oklahoma 74145 918/627-3550
P.O. Box 36638, Houston, Texas 77036 713/666-4393
P.O. Box 788, Palmdale, California 93550 805/947-7108
178 High Street, Teddington, Middlesex, England -01/977-0193

Circle 5 on Reader Service Card


GOOD NEWS!
NEW PAL MIX PRICE LISTS AVAILABLE
NO PRODUCT PRICE INCREASES
PAL MIX
The world's finest non-damag
drilling, completion and work
NEEDS GOOD PEOPLE!
HOLD THE PHONE! CALL JIMMY C.! PAL MIX CUT PRICES!
HERE IN THE WORLD IS PAL
PAL MIX PRESENTS
TO GET THERE FROM HERE!
AT THE TORQUE AND GUMBO TOO
Combat Lost Circulation
You don't have to be a chemist to use PAL-MIX Systems
IN THE OIL PATCH FOR 10 YEARS!
A CORRELATI
oil patche
THATS WHO!
How to use a systems approach to COMBAT LOST CIRCULATION
HAPPY BIRTHDAY! from all of us to all
KERR-McGEE AND OFFSHORE PETROLEUM
Polymer Blend S Workover Probl
re's the starting poin r your next workover..
Petroleum Associates of Lafayette Inc
Polymer Fluid
Gel Mud
Maximum Standpipe Pressure 2500 psi
Valid Data
HHP at bottom of hole
Flow Rate (GPM)
100 200 300 400 500 600 700 800 900 1000
50 100 150 200 250 300 350

DRILLING THE DEEP TUSCALOOSA? OR THE WOLFCAMP? OR WHEREVER!

CONSIDER THIS ↓ IT COULD SAVE YOU $.

AND-THE NEWEST MEMBER OF THE PAL FAMILY

PAL QUIP

DRILLING FLUIDS HANDLING and CONTROL EQUIPMENT

WHY PUT TONS OF SOLIDS IN YOUR MUD- AND THEN PAY GOOD MONEY TO GET RID OF SOLIDS ?

WHY FIGHT *TORQUE, DRAG, STUCK PIPE, SLOW DRILLING, FORMATION DAMAGE, SHALE PROBLEMS, LOST CIRCULATION, POLLUTION, ETC. ? ? ?*

THERE IS A BETTER WAY!

CONCERNED ABOUT HYDRAULICS ? WELL CONTROL ?

HAVE YOU TRIED OUR PLOSSGEN™ OR OPTHYD™ PROGRAMS ? HAVE YOU ORDERED YOUR COPY OF THE NEW PAL MIX™ DRILLING HYDRAULICS MANUAL FOR POLYMER DRILLING FLUIDS ?

"The Pioneers of Oilfield Polymer Technology"

Petroleum Associates of Lafayette, Inc.

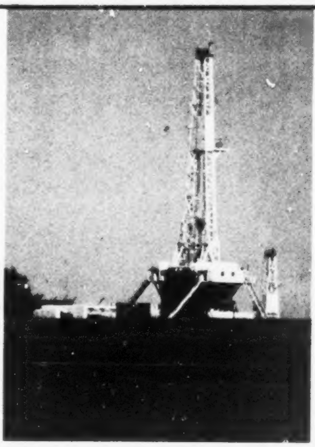
P.O. Box 52449/Lafayette, LA 70505/Phone (318) 837-9222/TWX: 510-976-5456

Circle 293 on Reader Service Card

Petroleum Engineer® INTERNATIONAL

Fall 1981 International

LAND RIG LOCATOR



URC Drilling Corp.'s new Rig 5 drills the O.L. No. 1A-25 well in busy Beckham County, for Universal Resources Corp.

TABLE OF CONTENTS

Abbreviations R-3
Drilling Contractors With Rotary Land Rigs in U.S. R-5
U.S. Contract Rotary Land Drilling Rigs R-8
Canadian Rotary Land Drilling Contractors R-55
Canadian Contract Rotary Land Drilling Rigs R-55
International Rotary Land Drilling Contractors R-60
International Contract Rotary Land Drilling Rigs R-62

LAND RIG LOCATOR AD INDEX

A-Z International R-38 (312)
American Manufacturing Co. R-63 (318)
Bawden Drilling, Inc. R-27 (306)
Blocker Energy R-43 (313)
Continental-Emsco Co. R-29 (308)
Dreco R-61 (317)
Emtec R-28 (307)
Gardner-Denver/Cooper Petroleum Equipment Div. R-64 (319)
Geolograph-Pioneer/Geosource, Inc. R-36-37 (311)
B.F. Goodrich Industrial Products Div. R-9 (297)
International Tool Co., Inc. R-32 (309)
Jaswell Drill Corp. R-69 (320)
Joy Petroleum Equipment Group R-22 (304)
L&M Radiator, Inc. R-24 (305)
Midway Manufacturing & Supply, Inc. R-56 (316)
NL Baroid/NL Industries, Inc. R-10-11 (298)
Nelson International R-18 (302)
Oilfield Industrial Lines R-35 (310)
Petroleum Associates of Lafayette R-2 (293)
Pyramid Manufacturing Co. R-72 (295)
Reynolds Metals Co. R-44-45 (314)
Sedis R-16 (300)
TRG Drilling Corp. R-12 (299)
Torrington Co. R-51 (315)
Tubular Finishing Works R-4 (296)
Waukesha Engine Div., Dresser Industries R-17 (301)
Wilson Manufacturing Co. R-71 (294)

DRAWWORKS MANUFACTURERS ABBREVIATIONS

Bethlehem Supply Co.	Beth
Bucyrus-Erie Co.	B. Erie
Cabot Corporation Machinery Division	Cabot/Franks
Cardwell Manufacturing Company Inc.	Crdwll
Challenger	Challenger
Continental-Emsco	EMSCO
Fred E. Cooper	Cooper
DeMag Manufacturing Co.	DeMag
Ewbank Manufacturing Div. Inc.	Ewbanks
George E. Failing Co.	Failing
Foramines	FORAMINES
Gardner-Denver	Gar-Den
Gary Drilling	Gary
Hacker Machine & Supply Co.	Hacker
Hooper Machine Works Inc.	Hooper
Howard-Turner Machine Works	Howard-Turner
Ideco Inc.	Ideco
Ingersoll-Rand Co.	Ingersoll
Joy Manufacturing Co.	Joy
Lee, Harold Engineering, The	Lee
Mayhew Supply Co. Inc.	Mayhew
Justiss Mears Oil Co.	JFJ
Mid-Continent Supply	M-CSCO
National Supply	Natl
OIME	OIME
OILWELL Div. (U.S. Steel)	OILWELL
Pool Company	Pool
Salzgitter Maschinen Manufacturing Co.	Salzgitter
Skytop/Brewster	Brwstr
Spencer-Harris Machine & Tool Company	Spencer
Sullivan	Sullivan
Superior (DRECO Ltd.)	Superior
Unit Rig Company	Unit
Wagner-Morehouse Inc.	Wgnr-Mrhse
Walker-Neer Manufacturing Company Inc.	Wlkr-Nr
The Wheland Company	Whlnd
Wichtex Machinery Co. Inc.	Wichtex
Wilson Manufacturing Co. Inc.	Wlsn

Petroleum Engineer INTERNATIONAL

Drilling Contractors With Rotary Land Rigs In U.S.

A

ABERCROMBIE DRLG INC 801 Union Center Wichita KS 67202 316-354-7751
ACT DRLG CO P O Box 690 Yukon OK 73099 405-354-7751
ADECO DRLG & ENGRG CO 505 2nd St SW Calgary Alberta T2P 1N8 Canada 403-266-6291
AIKINS DRLG CO 151 10th Ave N Shelby MT 59474 406-434-2565
ALANCO DRLG CO P O Box 1970 Alice TX 78332 512-664-2386
ALL WESTERN DRLG P O Box 414 Vernal UT 84078 801-789-4581
ALLEN DRLG CO P O Box 1389 Great Bend KS 67530 316-793-5681
ALLISON BROS DRLG CO 1275 Sherman St Denver CO 80203 303-861-2228
AMERICAN WELL SERV & DRLG P O Box 52412 Lafayette LA 70505 318-837-1852
AMOY DRLG & WELL SERV CORP 101 Elizabeth Ann Blvd Lafayette LA 70508 318-237-9000
A & P DRLG CO 2601 Northwest Expy Ste 709 Oklahoma City OK 73112 405-843-1557
ARROWHEAD DRLG LTD 710 999 Eighth St SW Calgary Alberta T2R 1J5 Canada 403-245-2817
ANDERSON-MYERS DRLG CO 3 Park Central Ste 1075 Denver CO 80202 303-623-5600
APACHIE DRLG INC Rte 2 Lowell OH 45744 614-373-6384
APOLLO DRLG & EXPL INC Campbell Center Ste M-1070 Dallas TX 75206 214-361-8920
ARAPAHOE DRLG CO P O Box 26687 Albuquerque NM 87125 504-247-2294
ARD DRLG CO P O Box 1030 Midland TX 79701 915-684-5716
ARDEN DRLG CO P O Box 968 Edmond OK 73034 405-348-1806
ARDMORE DRLG CO P O Box 308 Ardmore OK 73401 405-223-2292
ARMSTRONG DRLG INC P O Box 545 Wooster OH 44691 216-262-4101
ARTESIA FISHING TOOL CO P O Box 196 Artesia NM 88210 505-746-6651
ASPEN DRLG CO P O Box P Shelby MT 59474 406-434-5266
ASTRO DRLG CO 6801 S Western Oklahoma City OK 73139 405-632-9729
ATCO DRLG INC 3515 S Tamarac Ste 230 Denver CO 80237 303-770-2490
ATCO DRLG INC Southern Div 9100 Southwest Fwy Ste 111 Houston TX 77074 713-777-9199
ATLANTIC OIL CO P O Box 497 Paramount CA 90723 213-633-5151
AUSTIN JIMMIE & SONS INC P O Box 1240 Seminole OK 74868 405-382-2600
AUSTIN DRLG CO P O Box 1240 Seminole OK 74868 405-382-2600
AUSTIN-DUNHAM INC P O Box 1240 Seminole OK 74868 405-382-2600
AZTEC WELL SERV CO P O Box B Aztec NM 87401 505-334-6194

B

BAILEY PERNIE DRLG CO P O Box 70 Port Barre LA 70577 318-585-6462
BAKER & TAYLOR DRLG CO P O Box 2748 Amarillo TX 79105 806-373-8307
BAKER OIL & DRLG CO 6540 W Edison St Tulsa OK 74127 918-245-6317
BANDERA DRLG CO 800 T&P Lane Abilene TX 79602 915-676-5591
BANNER DRLG CO 222 W 27th St Scottsbluff NE 69361 308-632-3311
BARNES CORE DRLG CO 1350 Roberts Lane Bakersfield CA 93308 805-399-9181
BARNHART DRLG CO P O Box 2976 330 S Center Casper WY 82602 307-234-0894
BARR DRLG CORP P O Box 148 Salem IL 62881 628-548-0200
BASIN DRLG CORP 2601 Northwest Expy Oklahoma City OK 73112 405-840-2911
BASKI DRLG INC 6265 E Huerfano Rd Avondale CO 81022 303-948-2201
BAULCH DRLG CO 1800 Latta Rd Ada OK 74820 405-332-3155
BAWDEN DRLG INC 10200 Richmond Ave Houston TX 77042 713-974-3131
BAWDEN PETER DRLG INC 12832 Valley View St Garden Grove CA 92645 714-898-0491
BAYLESS DRLG CO 216 South Hill P O Box 2669 Farmington NM 87401 505-327-7214
BBL DRLG CORP 510 N Big Spring Midland TX 79701 915-683-5653
BDK DRLG CO P O Box 2488 Victoria TX 77901 512-573-9121
BEARD DRLG CO P O Box 263 Mt Carmel IL 62863 618-262-5194
BEARDEN JACK E DRLG CO 4726 Jacksboro Hwy Wichita Falls TX 76302 817-767-1474
BERENTZ DRLG CO P O Box 428 Eureka KS 67045 316-583-5202
BERGMAN DRLG INC 520 Union Center Bldg Wichita KS 67202 316-267-5291
BERTMAN PETROLEUM SERV CORP P O Box 729 Liberty TX 77575 713-336-5747
BF & B DRLG INC 2525 Northwest Expy Oklahoma City OK 73112 405-848-2866
BIG CHIEF DRLG CO P O Box 14837 Oklahoma City OK 73113 405-843-5721
BIG-O DRLG INC 2701 Paton Way Bakersfield CA 93308 805-589-2012
BIG SEVEN DRLG CO 400 Citizens Bldg 115 SE Third St Evansville IN 47708 813-425-3503
BIG 6 DRLG CO 7500 San Felipe Ste 666 Houston TX 77063 713-783-2300
BIG SPRINGS DRLG INC P O Box 8287 Wichita KS 67508 316-681-1732
BIGARD JAMES DRLG CO 1315 N Mission Rd Mt Pleasant MI 48858 517-772-5955
BILBO DRLG CO P O Box 1099 Victoria TX 77901 512-578-6258
BIRD DRLG 800 Lancaster Bldg Calgary Alberta T2P 1C2 Canada 403-264-1512
B-J INC P O Box 461 Crossville TN 38555 615-484-8969
BLACKSTONE DRLG INC P O Box 1148 McPherson KS 67460 316-241-1250
BLOCKER DRLG CANADA LTD 304 Sixth Ave SW 9th Floor Calgary Alberta T2P 0R4 Canada 403-233-0866
BLOCKER DRLG CO P O Box 2130 Alice TX 78332 512-664-0114
BODARD & HALE DRLG CO P O Box 1565 Shawnee OK 74801 403-273-7300
BOMAC DRLG 10403 Colfax Ste 700 Lakewood CO 80215 303-234-1444
BONRAY DRLG CORP Box 340 Rte 4 Oklahoma City OK 73121 405-424-4327
BRAHANEY DRLG CO P O Box 1694 Midland TX 79702 915-684-6305
BRANDT DRLG INC 1200 Douglas Bldg Wichita KS 67202 316-262-8357
BREA DRLG CO 12655 W Washington Blvd #106 Los Angeles CA 90066 213-390-8603
BRINKERHOFF-SIGNAL INC 3400 Anaconda Tower 555 17th St Denver CO 80202 303-571-1041
BROWN TOM INC P O Box 2608 Midland TX 79702 915-682-9715
BRUSHY CREEK DRLG CO P O Box 2418 San Angelo TX 76903 915-655-5709
BUFFALO DRLG INC 435 Page 220 W Douglas Wichita KS 67202 316-265-9686
BURNS L D DRLG CO One Parker Square Ste 500 Wichita Falls TX 76308 817-723-0512
BURRIS DRLG CO 555 17th St 2610 Anaconda Tower Denver CO 80202 303-892-9718
BURRO DRLG CO P O Box 4260 Victoria TX 77901 512-578-9021
BUTLER DRLG CORP P O Box 14291 Houston TX 77021 713-734-1661
BUTLER-JOHNSON INC 600 Travis Place Shreveport LA 71101 318-226-0731
BUZZINI DRLG CO 8700 Crownhill Ste 402 San Antonio TX 78209 512-824-3293

C

C & H DRLG CO Rt 1 Box 165-A Ranger TX 76470 817-647-3742
C & R DRLG CORP P O Box 857 Perry OK 73077 405-336-2403
CACTUS DRLG CO P O Box 2068 Hobbs NM 88240 505-393-2146
CACTUS DRLG CO 17347 Montfort Ste 300 Dallas TX 75240 214-934-3333
CACTUS DRLG CORP P O Drawer 2800 Midland TX 79702 915-563-2500
CACTUS DRLG LTD P O Box 1508 Calgary Alberta T2P 2L6 Canada 403-263-5670
CALIFORNIA PROD SERV INC P O Box 4489 Compton CA 90224 213-639-7074
CALVERT WESTERN EXPL CO 902 Fort Worth Club Bldg Fort Worth TX 76102 817-335-1131
CAM DRLG INC P O Box 2755 Abilene TX 79604 915-672-2551

C (Contd)

CAPE DRLG CO P O Box 756 Tyler TX 75710 214-593-8255
CARAWAY FRANK DRLG CO P O Box 982 San Angelo TX 76902 915-655-7968
CARDINAL DRLG CO P O Box 1077 Billings MT 59103
CARTER DEVELOPMENT CORP 1516 Two Turtle Creek Village Dallas TX 75219 214-521-9580
CARTER LAND & CATTLE CO P O Box 814 Chanute KS 66720 316-431-2080
CASTER WELL DRLG INC Forest Ave Ext Jamestown NY 14701 716-484-7436
CENTENNIAL EXPL & DRLG CO 2323 S Voss Rd Ste 370 Houston TX 77057 713-789-9475
C-G DRLG CO 340 Broadway Plaza Bldg 105 S Broadway Wichita KS 67202
CHALLENGER DRLG INC 340 East North Belt Suite 140 Houston TX 77060 713-820-9700
CHEROKEE DRLG & DEV CORP P O Box 2381 Midland TX 79702 915-563-1516
CHEROKEE DRLG & OPERATING INC Rte 2 Box 44AA Lowell OH 45744 614-373-6384
CHESLEY PRUET DRLG CO P O Box 447 Laurel MS 39440 601-649-1200
CHICO DRLG CO 808 Commerce Bldg Fort Worth TX 76102 817-336-8688
CHILES DRLG CO 5100 Westheimer Ste 135 Houston TX 77056 713-621-4991
CINCO DRLG CO P O Box 2089 Alice TX 78332 512-664-9556
CIRCLE BAR DRLG CO 2-3-4 Loyola Bldg Ste 505 New Orleans LA 70112 504-581-5502
CLEVELAND DRLG CO 305-4800 Stockdale Hwy Ste 30 Bakersfield CA 93309 805-327-5268
CLIFFS DRLG CO 2-Allen Center Ste 3150 Houston TX 77002 713-651-9426
COLEMAN DRLG CO P O Drawer 3337 Farmington NM 87401 505-325-6892
COMANCHE DRLG CO P O Box 636 Cut Bank MT 59427
COMANCHE DRLG INC Rte 2 Box 44AA Lowell OH 45744 614-373-6384
COMANCHE DRLG LTD 1625 Broadway St Ste 530 Denver CO 80293 303-629-5551
COMET DRLG CO P O Box 51529 Lafayette LA 70505 318-233-0414
COMMERCIAL DRILLERS INC 329 Mid America Bldg Midland TX 79701 915-684-4592
COMPADRE DRLG & EXPL CORP P O Box 97 Ardmore OK 73401 405-223-3127
CORPUS CHRISTI DRLG CO 4605 Weiskopf Lane Corpus Christi TX 74813 512-852-7642
CRAWFORD DRLG CO Rte 3 Box 254 Brenham TX 77833 713-836-1247
CRC MALLARD WELL INC P O Drawer 51498 OCS Lafayette LA 70505 318-233-4922
CRESCENT DRLG CO P O Box 626 Calhoun Rd Owensboro KY 42301 502-926-4656
CULVER DRLG CO 3910 Cameron St Lafayette LA 75006 318-269-0088
CYCLONE DRLG & WORKOVER INC Rte 2 Box 31 Stroud OK 74079 918-968-3551
CYCLONE DRLG INC P O Box 246 Gillette WY 82716 307-682-4161

D

DAHLQUIST DRLG INC P O Box 602 Bakersfield CA 93302 805-327-1275
DAKOTA DRILLERS INC P O Box 936 Pierre SD 57501 605-224-8393
DAMAC DRLG CO P O Box 1164 Great Bend KS 67530 316-792-1353
D & D DRLG CO P O Box 351 Ferriday LA 71334 318-757-3274
D L DAVIS DRLG CO P O Box 570 Mt Carmel IL 62863 618-262-7624
D B DRLG CORP 100 Chestnut Abilene TX 79602 915-672-2841
DELTA DRLG CO P O Box 2012 Tyler TX 75710 214-595-1911
DIXILYN-FIELD DRLG CO P O Box 4251 Houston TX 77210 713-877-8850
DIXON DRLG CO P O Box 2773 Abilene TX 79604 915-676-8564
DNB DRLG INC 515 R H Garvey Wichita KS 67202 316-264-8328
DOSS INC P O Box 542 Van Vleck TX 77482 713-245-1711
DREILING OIL INC Rte 1 Victoria KS 67671 913-735-2204
DRILCON INC 8150 N Central Expwy Ste 1255 Campbell Centre II Dallas TX 75206 713-780-8772
DRILLERS INC 5629 FM 1960 W Ste 202 Houston TX 77069 713-893-1020
DUAL DRLG CO P O Box 240 Wichita Falls TX 76307 817-723-2127
DUKE DRLG CO P O Box 823 Great Bend KS 67530 316-793-8366
DUNNE-GARDNER PETROLEUM INC 200 W Douglas Ste 250 Wichita KS 67202 316-265-1611

E

EAGLE DRLG CO 114 Jefferson Davis Blvd Natchez MS 39120 601-445-8863
EAGLE DRLG INC P O Box 8609 Wichita KS 67208 316-682-5513
EAGLE PRODUCTION & DRLG SERV 3626 N Hall St Dallas TX 75219 214-521-0021
EARL & SONS DRLG INC P O Box 3 Cedar Crest NM 87008 504-281-3880
EARNEST INC P O Box 1216 Okmulgee OK 74447 918-756-2616
ECONOMY DRLG INC P O Box 35 Converse TX 78109 512-659-1977
EDCO DRLG CO P O Box 645 El Dorado KS 67042 316-321-9202
EDWARDS WELL SERV 7001 Fruitvale Extension Bakersfield CA 93308
ELENBURG EXPL INC P O Box 1850 Havre MT 59501 406-265-5811
ELJAY DRLG CORP 8955 Katy Fwy Ste 101 Houston TX 77024 713-932-6771
E & H DRLG CO P O Box 1058 Graham TX 76046 817-549-0370
ENERGY DRLG CO P O Box 905 Natchez MS 39120 601-446-5259
ENOPCO 12700 Park Central Pl Ste 1204 Dallas TX 75251 214-387-8503
EQUITY DRLG CO 3850 E Frank Phillips Blvd Bartlesville OK 74003 918-534-1700
EXCELL DRLG CO P O Box 305 Wray CO 80758 303-332-4123
EXETER DRLG NORTHERN INC P O Box 17349 Denver CO 80217 303-861-0181
EXETER DRLG SOUTHERN INC 1010 Common St 2635 Bank Bldg New Orleans LA 70112 505-581-1498
EXPLORER DRLG CO P O Box 53897 Lafayette LA 70505 318-981-2886

F

FAIRMAN DRLG CO P O Box 288 Dubois PA 15801 814-371-8410
FAITH DRLG CO P O Box 7 Houston TX 77001 713-524-7111
FALCON DRLG CO 1700 SE 22 Second Oklahoma City OK 73129 405-670-3161
FARMER JOHN O INC P O Box 352 Russell KS 67665 913-483-3144
FARNSWORTH & KAISER DRLG CO 13 S Seneca Newcastle WY 82701 307-746-2591
FAULK DRLG CO P O Box 429 Breckenridge TX 817-559-3744
FELDERHOFF BROS DRLG CO P O Drawer 400 Muenster TX 76252 817-665-3592
FINLEY OIL WELL SERV INC P O Box 7296 Long Beach CA 90807 213-595-4505
FISCUS DRLG CO Rte 1 Box 572-A Big Spring TX 79720 915-393-5211
FISHER DRLG CORP 10 E Third St Ste 520 Tulsa OK 74103 918-582-4457
FLOURNOY DRLG CO P O Box 491 Alice TX 78332 512-668-8364
FOREX NEPTUNE &/OR AFFILIATES 20 Ave Rapp BP 111 07 75326 Paris Cedex France 555-95-34
FORWEST INC 11211 Katy Fwy Ste 530 Houston TX 77079 713-932-7976
FOUR CORNERS DRLG CO P O Box 1067 Farmington NM 87401 505-327-0322
FRANCE DRLG CORP 700 Travis Place Shreveport LA 71101 318-221-3434
FRANKLIN DRLG INC P O Box 336 Graham TX 76046 817-549-5661
FREEMAN DRLG CO 251 N Water Ste 10 Wichita KS 67202 316-263-7049
FRIO DRLG CO 1216 Guaranty Bank Plaza Corpus Christi TX 78475 512-883-8555
F-W DRLG CO 4350 S Treadaway Abilene TX 79602 915-695-2064
FWA DRLG CO P O Box 419 Wichita Falls TX 76307 817-322-0761

Petroleum Engineer® INTERNATIONAL

Drilling Contractors With Rotary Land Rigs In U.S.

G

GABBERT-JONES INC 830 Sutton Place Wichita KS 67202 316-263-6209
GALLAGHER DRLG INC P O Box 3046 Evansville IN 47702 812-425-8256
G-E DRLG CO 2711 Continental Dr Victoria TX 77901 512-578-5245
GARY DRLG CO 7001 Fruitvale Extension Bakersfield CA 93308 805-589-0111
GAY DRLG CONTRACTORS P O Box 457 Duncan OK 73533 405-255-2528
GCO DRLG CO P O Box 3134 Abilene TX 79604 915-673-4731
GEAR DRLG CO 470 Denver Club Bldg Denver CO 80202 303-623-4422
GENERAL WELL SERV INC P O Box 308 Cut Bank MT 59427 406-873-2331
GIBSON DRLG CO P O Box 1540 Kilgore TX 75662 214-984-5068
GIBSON J W WELL SERV CO 3025 S Parker Rd Ste 711 Aurora CO 80014 303-752-2527
GLASSCOCK DRLG INC P O Box 51716 OCS Lafayette LA 70505 318-232-8620
GLENDEL DRLG CO P O Box 765 Abbeville LA 70510 318-898-1637
GLOBE DRLG CO 1212 The Peoples Plaza Tower Tyler TX 75702 214-593-0281
GOLDEN STATE DRLG INC 3312 Fruitvale Ave Bakersfield CA 93308 805-589-0730
GOLDRUS DRLG CO 900 First City National Bank Houston TX 77002 713-658-9271
GOPHER DRLG CO P O Box 949 Thicket TX 77374 713-298-2511
GRAVES DRLG CO 910 Union Center Wichita KS 67202 318-233-4400
GREAT SOUTHERN OIL & GAS CO P O Box 52707 Lafayette LA 70505 318-233-4400
GREEN DRLG CO P O Box 667 Gillette WY 82716 307-686-1381
GREY WOLF DRLG CO 2000 S Post Oak Rd Ste 1730 Houston TX 77056 713-626-1373
GUFFEY-SCHLENSKER DRLG CORP P O Box 1330 Richardson TX 75080 214-231-8551
GUTHRIE MC LAREN DRLG LTD 14630 119th Ave Edmonton Alberta T5L 2P2 Canada 403-455-3191
GWALTNEY DRLG CO P O Box 520 Washington IN 47501 812-254-5085

H

HACK DRLG CO P O Box 5108 Abilene TX 79605 915-692-4111
H & S DRLG CO 320 S Boston Ste 2000 Tulsa OK 74103 918-587-8163
HARKINS & CO P O Box 1490 Alice TX 78332 512-883-3022
HARPEL DRLG CO P O Box 2811 Casper WY 82602 307-265-9193
HARPER-TURNER DRLG 904 Hightower Oklahoma City OK 73102 403-232-3241
HARRIS DRLG CO Box 99 Hwy 15 Grayville IL 62844 618-375-2211
HARRIS WELL SERV INC P O Drawer 949 Eunice LA 70535 318-457-3376
H F HATCHER & SON P O Box 167 Smackover AR 71762 501-725-3034
HELMERICH & PAYNE INTL DRLG Utica at 21st Tulsa OK 74114 918-742-5531
HEMPHILL CORP 4834 S 83rd E Ave Tulsa OK 74145 918-622-5133
HERB EXPL P O Box 1934 Abilene TX 79604 915-672-1291
HI TOWER DRLG Box 6650 Station D Calgary Alberta T2P 2V8 Canada 403-231-1211
HICKMAN DRLG CO P O Box 1467 Woodward OK 73801 405-256-8688
HILLIN DRLG CO P O Box 152 Odessa TX 79760 915-563-3560
HINTON W B DRLG CO P O Box 1237 Mt Pleasant TX 72455
HOLLIDAY DRLG INC P O Box 3489 Midland TX 79701 915-697-2208
HONDO DRLG CO P O Drawer 2516 Midland TX 79702 915-682-9401
HONEYMON DRLG CO 4300 Highline Blvd Ste 356 P O Box 74506 Oklahoma City OK 73147 405-947-2319
HOWELL DRLG INC 635 Milam Bldg San Antonio TX 78205 512-227-5283
H-30 DRLG INC 251 N Water Wichita KS 67202 316-263-2043
HUDSON LEONARD DRLG CO INC P O Box 1876 Pampa TX 79065 806-665-1816
HUGHES DRLG CO Rte 4 Box 38-A Enid OK 73701 405-234-7222
HURT CLINT & ASSOCIATES INC P O Box 1973 Midland TX 79702 915-683-6381
HUSKY DRLG CO 200 E First Ste 500 Wichita KS 67202 316-263-7904
HYLTON DRLG CO 7512 Kimberly Ave Bakersfield CA 93308 713-659-4816

I

INLAND WELL SERV INC P O Box 488 Abbeville LA 318-893-3486
INTERNATIONAL PETROLEUM SERV CO P O Box 547 Rte 6 N Sheffield PA 16347 814-968-3295
IRON DRLG CO P O Box 3525 3201 S Van Buren Enid OK 73701 405-234-1292
IRONWOOD DRLG INC 1021 ESE Loop 323 Ste 350 Tyler TX 75703 214-561-5026
ITT EASON OIL CO 2601 NW Expwy Oil Center East Ste 1100E Oklahoma City OK 73112 405-848-8711
IX DRLG CO P O Drawer 835 Stephenville TX 76401 817-965-7818

J

J & C DRLG CO P O Box 216 Refugio TX 78377 512-526-2376
J & W DRLG CO 1717 9th St Wichita Falls TX 76301 817-767-5447
JOHNN DRLG CO P O Box 6189 Odessa TX 79762 915-563-1280
JOHNSON-BATES DRLG CO P O Box 128 Konawa OK 74849 405-925-3256
JONES DRLG CO P O Box 1058 Albany TX 76430 915-762-3652
JONES DRLG CORP P O Box 1185 Duncan OK 73533 405-255-3532
J3 DRLG CO 1450 Bank & Trust Corpus Christi TX 78477 512-881-9773
JUSTISS OIL CO P O Drawer N Jena LA 71342 318-992-4111
J-V DRLG CO 4445 Commerce ST Evansville IN 47710 812-424-3571

K

KAN-GO INC P O Box 254 Marion KS 66861 316-382-2665
KAY DRLG CO P O Box 1622 Ponca City OK 74601 405-765-2407
K B DRLG CO P O Box 1848 Harve MT 59501 406-265-9832
K L KELLOGG & SONS P O Box 7053 4220 Long Beach Blvd Long Beach CA 90807 213-422-1247
KENAI DRLG OF NEW MEXICO INC 5700 N Lovington Hwy Hobbs NM 88240
KENAI DRLG OF TEXAS INC P O Box 6725 Odessa TX 79762 915-362-2323
KENAI DRLG ROCKY MOUNTAIN INC P O Box 1198 Mills WY 88240 307-234-5122
KENAI DRLG WEST COAST INC P O Box 2248 Orcutt CA 93454 805-928-1701
KENDALL DRLG CO P O Box 5304 Evansville IN 47715 812-477-5535
KENTING DRLG CO 370 700 Sixth Ave SW Calgary Alberta T2P 0T8 Canada 403-263-2980
KERN DRLG CO P O Box 688 Magnolia AR 71753 501-234-5011
KINGERY DRLG CO P O Box 1588 Ardmore OK 73401 405-223-6823
KISSINGER PETROLEUM CORP P O Box 22004 Denver CO 80222 303-773-0550
LAGERSEN DRLG CO 302 Beck Bldg Shreveport LA 71101 318-227-9939
LAMA DRLG CO P O Box 430 Natchez MS 39120 601-445-5568
LANDFORD DRLG CO P O Box 98 Shreveport LA 71161 318-869-2519
L & G DRLG CO P O Box 35 Mt Pleasant MI 48858 517-772-3083
LANDIS DRLG CO P O Box 3579 One Marienfeld Place Ste 350 Midland TX 79702 915-683-4151
L & M DRLG INC P O Box 647 Artesia NM 88210 505-748-2205

L (Contd)

L & R DRLG CO P O Box 936 Pierre SD 57501 605-224-2467
LAUCK D R OIL CO 221 S Broadway Ste 400 Wichita KS 67202 316-363-8267
LAYTON OIL CO P O Box 263 Independence KS 67301 316-331-1150
L D DRLG CO P O Box 324 Great Bend KS 67530 316-793-3051
LEMKCO DRLG CO 6767 Golden West Ave Red Deer Alberta T4P 1A7 Canada 403-342-4200
LESTER DAN DRLG CO P O Drawer N Jefferson TX 75657 214-665-2511
LIN-MOUR DRLG CORP 1411 13th St Wichita Falls TX 76301 817-322-8550
LLL DRLG CO P O Box 188 Bloomfield NM 87413 505-632-8045
LOFFLAND BROS CO P O Box 2847 Tulsa OK 74101 918-622-9330
LOGAN DRLG CO P O Box 1622 100 S Washington Enid OK 73701 405-233-5048
LOHMANN-JOHNSON DRLG CO 111 Main St Evansville IN 47708 812-424-8291
LORD DRLG CO 14618 W Sixth Ave Golden CO 80401 303-279-2471
LOUISE DRLG CO P O Box 272 Louise TX 77455 713-648-2641
LOWE DRLG CO P O Box 1368 Albany TX 76430 915-762-2530
LUKE GRACE CO 710 Petroleum Bldg Wichita Falls TX 76301 817-723-2187

M

MAGEE-POOLE DRLG CO P O Box 2000 Alice TX 78332 512-664-1891
MAGIC CIRCLE DRLG CORP 3001 United Founders Blvd Oklahoma City OK 73112 405-843-6654
MANNING R L CO 1700 Broadway Ste 2200 United Bank Center Denver CO 80290 303-839-1977
MARION DRLG CO P O Box 16006 Mobile AL 36616 205-626-3300
MARLIN DRLG CO P O Box 51887 OCS Lafayette LA 70501 318-837-2781
MARLIN WEST P O Box 551 Bakersfield CA 93302 805-327-8304
MAR-TAY DRLG CO P O Box 1216 Drumright OK 74030 918-352-3802
MATAGORDA MARINE DRLG CO P O Box 10307 Corpus Christi TX 78410 512-289-1366
MAXWELL HERRING DRLG CO P O Box 1297 Tyler TX 75710 214-593-1737
MAZ KAR OIL CO 126 W Broadway Centralia IL 62801 618-532-9327
MC CONNELL DRLG CO 111 Frio St Lockhart TX 78644 512-389-2627
MC CUTCHEN DRLG CO 410 Oil & Gas Bldg Wichita Falls TX 76301 817-322-9231
MC DONALD & SON DRLG CO SSRB Box 68 Marble Falls TX 78654 512-598-5731
MC LENNAN DRLG CO P O Box 6 Nowata OK 74048 918-273-1265
MC VAY DRLG CO 308 Philtower Bldg Tulsa OK 74103 918-584-5472
MEGARGEL DRLG CO P O Box 356 Megargel TX 76370 817-563-2311
MELTON DRLG CO 7101 Downing Ave Bakersfield CA 93308 805-587-0521
MERCURY DRLG CO 1701 SE 25th St Oklahoma City OK 73129 405-672-4441
MERIT DRLG CO 14811 St Mary's Lane Ste 148 Houston TX 77079 713-493-1001
MESA DRILLERS P O Box 108 Lubbock TX 79408 806-744-1017
MESA DRLG CO 241 Pine One Energy Square Ste 7A Abilene TX 79601 915-673-4787
MGF DRLG CO-HOUSTON 2626 Richmond Ave Houston TX 77098 [illegible]3-526-7236
MGF DRLG CO-LAFAYETTE P O Box 938 Scott LA 70583 318-237-6161
MGF DRLG CO-MIDLAND P O Box 370 Midland TX 79701 915-684-7173
MHC DRLG CO P O Box 399 Rio Vista CA 94571 707-374-2425
MICHIGAN CONSOLIDATED GAS CO P O Box 1118 218 Maple St Big Rapids MI 49307 616-796-3501
MID ATLANTIC OIL CO P O Box 198 Belle Valley OH 43717 614-732-5674
MIDCO DRLG INC 200 E First Ste 520 Wichita KS 67202 316-265-1808
MIDWEST DRLG LTD 1026 Cookson Ave New Philadelphia OH 44663 216-339-5515
MILLER CONTRACT DRLG INC P O Box 478 Livingston TN 38570 615-823-6425
MILLER DRLG CO Rte 45 Box 450 Fort Smith AR 72901 501-646-3481
MIN-TEX DRLG CORP P O Box 1136 Mineral Wells TX 76067 817-325-9591
MITCHELL GEORGE N DRLG CO P O Drawer 111 Airport Rd Carmi IL 62821 618-382-2343
MND DRLG CORP P O Box 248 Bridgeport TX 76026 817-683-5106
MOLEN DRLG CO P O Box 869 Billings MT 59103 406-259-2591
MONTGOMERY DRLG CO P O Box 2508 Bakersfield CA 93303 805-327-5736
MORAN BROS INC 1105 Holliday Wichita Falls TX 76301 817-723-1432
MORAN DRLG CORP 262 Northbelt Houston TX 77060 713-820-1865
MORAN E W DRLG CO 1200 Oil & Gas Bldg Wichita Falls TX 76301 817-322-7891
MORANCO P O Box 1860 Hobbs NM 88240 505-393-7176
MORRISON DRLG & PROD CO One Energy Square Ste 8-B Abilene TX 79601 915-677-8523
MORROW DRLG CO P O Box 4936 Odessa TX 79760 915-333-2875
MOSLEY WELL SERV INC P O Box 970 Minden LA 71055 318-377-2393
MOXE DRLG CO 106 W Eighth McCook NE 69001 308-345-2945
MURCO DRLG CORP 1908 Beck Bldg Shreveport LA 71101 318-221-7373
MURFIN DRLG CO 617 Union Center Bldg Wichita KS 67202 316-267-3241
MURLYNSON DRLG CO P O Box 185 Alice TX 78332 512-664-3807
MURPHY PETE DRLG CO P O Box 185 Alice TX 78332 512-664-4540
MUTUAL OF AMERICA INC P O Drawer 1446 Santa Fe NM 87501 505-982-5501

N

NABORS ALASKA DRLG INC 4796 Business Park Blvd Ste 1 Anchorage AK 99503 907-278-2511
N & C DRLG CORP Rte 3 Box 3361 Boerne TX 78006 512-755-8333
NECK DRLG CO Bin X Taft CA 93268 805-769-8811
NELSON DRLG & WELL SERV 1325 American Tower Shreveport LA 71101 318-221-6890
NEW & HUGHES DRLG CO P O Drawer 1487 Natchez MS 39120 601-442-1607
NICKLOS DRLG CO P O Box 752 Eunice LA 70535 713-658-8245
NICOR DRLG CO 500 Reunion Center 9 E Fourth St Tulsa OK 74103 918-587-5[illegible]07
NIXON DRLG CO P O Box 632 Luling TX 78648 512-875-2416
NIXON R P 207 W 12th St Hays KS 67601 913-628-3834
NOBLE DRLG CORP 1924 S Utica Ste 600 Tulsa OK 74104 918-749-9901
NORMAN DRLG CO Rte 8 Box 305 Clarksville TN 37040 615-645-4361
NORTHEAST DRLG CO Rte 4 Box 38-A Enid OK 73701 405-234-6771
NORTON DRLG CO 607 Lubbock Natl Bank Bldg Lubbock TX 79401 806-747-3324
NORWOOD A N INC P O Box 310 Midland TX 79702 915-683-3972
NRG DRLG CO P O Box 1432 Owensboro KY 42301 502-685-8118

O

O'CONNOR & YOUNG DRLG CO 1980 S Post Oak Rd Ste 2380 Houston TX 77056 713-961-1107
OILWELL DRLG INC Hwy 16S P O Box 988 Graham TX 76046 817-549-6960
OLIVER E L DRLG CO P O Box 25103 Oklahoma City OK 73125 405-677-2461
O'NEAL DRLG CO P O Box 20667 Oklahoma City OK 73120 405-751-3939
OWEN DRLG CO P O Box 861 Magnolia AR 71753 501-234-6300
OWENS JACK SERV CO 1626 Del Dayo Dr Carmichael CA 90608 916-485-8995

Drilling Contractors With Rotary Land Rigs In U.S.

P

PADRE DRLG CO 2501 Suntide Rd Corpus Christi TX 79410 512-241-2891
PAR-CO DRLG INC P O Box 873 Natchez MS 39120 601-442-6421
PARAMOUNT DRLG CO P O Box 1735 Shreveport LA 71166 318-227-8313
PARKER DRLG CO 8 E Third St Tulsa OK 74103 918-585-8221
PEARL EXPL INC P O Box 2179 Alice TX 78332 512-664-2701
PENROD DRLG CO 1407 Main St Dallas TX 75202 214-651-0187
PEP DRLG CO P O Box 824 Mt Vernon IL 62864 618-242-2205
PETERS DRLG INC P O Box 742 Great Bend KS 67530 316-793-6721
PETRA DRLG P O Box 3596 Tulsa OK 74101 918-627-1650
PETROWELL CORP WOLFCAMP DRLG DIV 9 Canyon Crest Dr Corona Del Mar CA 92625 714-760-8651
PICKRELL DRLG CO 110 N Market Ste 205 Wichita KS 67202 316-262-8427
PILGRIM DRLG CO 6733 S Yale Ave Tulsa OK 74136 918-743-6652
POOL WELL SERV 2077 S Gessner Rd Houston TX 77063 713-780-4999
PORTER GENE DRLG CO P O Box 389 Cushing OK 74023
POWER RIG DRLG CO P O Box 52808 Lafayette LA 70505 318-234-4525
PRAIRIE DRLG CO 5720 W Yellowstone Casper WY 82601 307-234-7191
PRC DRLG CO P O Box 1121 Corpus Christi TX 78403 512-884-8763
PRECISION EXPL CO P O Box 278 Olney IL 62450 618-395-3096
PROJECT 5 DRLG CO 2212 Briggs St Norman OK 73069 405-360-4810
PROVINS D DRLG CO 2113 Enterprise Dr Mt Pleasant MI 48858 517-773-6946
PRUET-RAM CO P O Box 324 Laurel MS 39440 501-863-3612
PULLIAM DRLG CO P O Box 1104 Woodward OK 73801 405-256-4000
PYRAMID OIL WELL SERV P O Box 3225 Santa Fe Springs CA 90670 213-944-6703

Q

QUANZA DRLG INC 3824 N Meridian Ste 110 Oklahoma City OK 73112 405-942-7900
QUARLES DRLG CORP 320 S Boston Ste 1024 Tulsa OK 74103 918-583-3004
QUINTEX DRLG CO 1647 E Third ST Tulsa OK 74120 918-589-7623

R

RBI DRLG CO LTD 1200 Milam St Ste 3200 Houston TX 77027
RAINBOW DRLG CO P O Box 1779 1108 N Kilgore St Kilgore TX 75662 214-984-8516
RAINS & WILLIAMSON OIL CO 222 W Douglas Ste 435 Wichita KS 67202 316-265-9686
RAM DRLG CO P O Box 118 Browns IL 62818 618-446-5117
RANGE DRLG CO 240 Page Ct 220 W Douglas Wichita KA 67202 316-265-6231
RAPAD DRLG CO P O Box 324 Laurel MS 39440 501-863-3612
RATLIFF DRLG CO P O Box 988 1510 W Main St Duncan OK 73529 405-255-2916
RAY RESOURCES CORP P O Box 235 Culloden WV 25510 304-743-9067
REBEL DRLG CO P O Box 1151 Natchez MS 39120 601-446-7831
RED TIGER DRLG CO 1720 Kansas State Bank Bldg Wichita KS 76202 316-263-2371
REMCO DRLG CORP 4131 Meadow Land Bossier City LA 71111 318-742-9595
REPCO INC P O Box 325 Duncan OK 73533 405-252-3005
REPUBLIC DRLG & SERV INC P O Box 27406 Houston TX 77056 713-877-8777
REPUBLIC DRLG CO 11823 E Slawson Ave Santa Fe Springs CA 90670 213-945-3661
RESOURCE DRLG INC P O Box 4341 Houston TX 77210
RHODES & HICKS DRLG CO P O Box 1579 Alice TX 78332 512-664-3467
RICHARDS-ARMSTRONG INC P O Box 1149 Bay City TX 77414 713-245-8389
RICHARDS DRLG ASSOCIATES P O Box 1149 Bay City TX 77414 713-245-8389
RICHARDS DRLG CO P O Box 1149 Bay City TX 77414 713-245-8389
RICHARDS OPERATING P O Box 1149 Bay City TX 77414 713-245-8389
RILEY DRLG CO 907 Scurry Big Spring TX 79720 915-267-5635
RINE DRLG CO 300 W Douglas Ste 600 Wichita KS 67202 316-267-1333
RIO COLORADO DRLG CO 330 North Belt East Ste 100 Houston TX 77060 713-445-2231
ROBINSON BROS DRLG CO P O Box 1027 Woodward OK 73801 405-254-3365
ROBINSON DRLG OF TEXAS INC P O Box 311 Big Spring TX 79720 915-267-5277
ROCKHOLD ENGRG INC P O Box 698 Great Bend KS 67530 316-729-2506
ROCKWELL DRLG CO P O Box 993 400 W Fifth St Holdenville OK 74848
RODEN J B DRLG CO P O Box 880 Mills WY 82644 307-266-6552
ROD RIC CORP P O Box 1767 Midland TX 79702 915-682-7880
ROSAMOND DRLG CO P O Box 7656 West Monroe LA 71203 318-323-7736
ROTARY DRLG INC 117 E Elm Tyler TX 75702 214-592-8174
ROWAN DRLG-US 5051 Westheimer Houston TX 77056 713-621-7800
ROYCO DRLG CO P O Box 681 Owensboro KY 42301 502-685-3687
RWIT DRLG CO P O Box 551 Holdenville OK 74848 713-496-5000

S

SABRE DRLG CO Div TRG Drlg Corp P O Box 1150 Cushing OK 74023 918-225-3502
SAFARI DRLG CORP P O Box 3236 Abilene TX 79604 915-677-2826
SAGE DRLG CO 222 Sutton Place Wichita KS 67202 316-263-6139
S & T DRLG LTD 5825 98 St Edmonton Alberta T6E 3L4 Canada 403-437-1640
SAN JACINTO DRLG CO 2014 Persa St Houston TX 77019 713-227-5353
SANDERS DRLG CO P O Box 1086 New Iberia LA 70560 318-364-1537
SANDIA DRLG CO 2500 Broadway Bldg Ste 5-B Edmond OK 73034 405-340-0210
SANTA FE DRLG CO 505 S Main St Orange CA 92668 714-558-1300
SANTA FE DRLG CO (WESTERN) P O Box 992 Odessa TX 79760 915-367-4181
SAWYER DRLG & SERV INC P O Box 1533 Shreveport LA 71105 318-227-8150
SCANDINAVIAN MONTGOMERY DRLG P O Box 2508 Bakersfield CA 93303 805-327-5736
SCHLENSKER DRLG CORP P O Box 1330 Richardson TX 75080 214-231-8551
SCOTT DON DRLG CO P O Box 177 Jonesville MI 49250 517-849-9237
SCOTT JERRY DRLG CO P O Box 1488 Seminole OK 74868 405-382-2202
SEARCH DRLG CO Wellington Sq Office Park Ste 400 Amarillo TX 79102 806-359-7645
SERVICE DRLG CO Fourth Natl Bank Bldg Ste 1800 Tulsa OK 74119 918-582-9141
SERVICE DRLG CO P O Box 5320 Borger TX 79007 806-273-7573
SH & J DRLG CORP P O Drawer 888 Magnolia AR 71753 501-234-4600
SHARP DRLG CO P O Box 1271 Midland TX 79702 915-683-3384
SHAWNEE DRLG CO Rte 2 Box 44AA Lowell OH 45744 614-373-6384
SHELBY DRLG INC 2830 Security Life Bldg Denver CO 80202 303-629-7035
SHIELDS DRLG CO P O Box 709 Russell KS 67665 913-483-3141
SHULER DRLG CO 3514 W Hillsboro El Dorado AR 71730 501-863-7234
SIMMONS DRLG LTD 524 550 Sixth Ave SW Calgary Alberta T2P 0S2 Canada 403-263-7686
SITTON DRLG CO 503 Lubbock Natl Bank Bldg Lubbock TX 79401 806-763-4442
SLAWSON DRLG CO 200 Douglas Bldg Wichita KS 67202 316-263-3201

S (Contd)

SLEDGE DRLG CORP First Natl Bank Ste 2301 Midland TX 79701 915-683-5261
SLOAN DRLG CO 2825 E Skelly Dr Ste 827 Tulsa OK 74105 918-749-0533
SMART DRLG CO 9 E Fourth St Tulsa OK 74103 918-584-5596
SMITH DRLG CO P O Box 150 Lawrenceville IL 62439 618-943-2342
SNYDER DRLG WELL SERV CO P O Box E Hwy 1 S Grayville IL 62844 618-375-2491
SOAPE DRLG CO P O Box 1284 Billings MT 59103 406-252-1341
SOJOURNER DRLG CORP P O Box 3234 Abilene TX 79604 915-672-2832
SOUTH TEXAS DRLG CO 2005 Alamo Natl Bldg San Antonio TX 78205 512-224-5557
SOUTHLAND DRLG CO 14811 St Mary's Ste 270 Houston TX 77079 713-497-1995
STAHLCO DRLG CO P O Box 2231 Amarillo TX 79105 806-376-5038
STAR DRLG 2700 Anaconda Tower Denver CO 80202 303-571-4800
STERLING DRLG CO P O Drawer 3068 Midland TX 79702 915-685-3054
STERLING DRLG CO P O Box 129 Sterling KS 67579 316-278-2131
STOEPPELWERTH DRLG INC 1111 E H McCook NE 69001 308-345-1766
STONE M L DRLG CO P O Box 299 Saratoga TX 77585 713-298-2511
STRATA DRLG INC P O Box 355 Great Bend KS 67530 316-793-7971
SUMPTER & BARKER DRLG CO P O Box 1081 Stillwater OK 74074 405-372-4063
SUNDOWN DRLG CO P O Drawer AP Eagle Pass TX 75852 512-773-1173
SWEETMAN DRLG INC 410 One Main Place Wichita KS 67202 316-265-5561
SYNTEK DRLG CORP One Energy Square Ste 10-LB Abilene TX 79605 915-677-8515

T

T-L DRLG CO 414 W Phillips Ste 137 Conroe TX 77301 713-756-7726
TAHOE DRLG CO 206 N Main Midland TX 79701 915-682-5325
TAYLOR DRLG CO P O Box 597 Chehalis WA 98532 206-748-3445
TEK DRLG CO 1224 Josey Lane Ste B Carrollton TX 75006 214-242-8314
TESORO DRLG CO P O Box 2784 Laurel MS 39440 601-425-4312
TEXAS DRLG CO Abilene Natl Bank Bldg Ste 400 Abilene TX 79603 915-672-7803
TEXLAND DRLG CORP 600 First Natl Bank Bldg Abilene TX 79601 915-672-2841
THOMAS DRLG CO P O Box 400 Duncan OK 73533 405-252-5580
THOMPSON DRLG CO 4 Corporate Dr Ste 102 Newport Beach CA 92660 714-644-9292
THUNDERBOLT DRLG INC P O Drawer 129 Winnsboro TX 75494 214-342-5221
TIERRA DRLG CORP P O Box 3339 Number One Petroleum Place Ste 300 Abilene TX 79604 915-677-7291
TOLTEK DRLG CO 340 Denver Club Bldg Denver CO 80202 303-255-5255
TOP DRLG CO 2601 NW Expressway Ste 805W Oklahoma City OK 73112 405-521-9737
TORREON DRLG CO 805 The 600 Bldg Corpus Christi TX 78473 512-882-1953
TR DRLG CO P O Box 4882 Monroe LA 71203 318-388-4191
TRANSCONTINENTAL DRLG CO 555 17th St Ste 2700 Denver CO 80202 303-571-4800
TRANSCONTINENTAL DRLG CO 2nd Fl Petroleum Bldg San Angelo TX 76903 915-653-3324
TRANSCONTINENTAL DRLG CO Jet Div 920 American Tower Shreveport LA 71101
TRANSWORLD DRLG CO P O Box 25861 Oklahoma City OK 73105 405-270-1313
TREND DRLG CO P O Box 3310 Enid OK 73701 405-233-7838
TRG DRLG CORP P O Box 20020 Oklahoma City OK 73156 405-755-5002
TRI-SERVICE DRLG CO P O Drawer 70 Midland TX 79701 915-684-6641
TRI-J DRLG CO P O Box 5338 Abilene TX 79605 915-698-8026
TRI-LAND DRLG CO P O Box 18605 Oklahoma City OK 73154
TRIAD DRLG Div UGI Development Co 1100 Bitting Bldg Wichita KS 67202 316-263-0232
TRIGG DRLG CO P O Box 18605 Oklahoma City OK 73118 405-528-4456
TRIPLE H DRLG CO 333 W Main Ardmore OK 73401 405-226-3900
TRUE DRLG CO P O Drawer 2360 Casper WY 82601 307-237-9301
TUCKER DRLG CO P O Box 1876 San Angelo TX 76901 915-655-6773
TWIN ARROW INC P O Box 948 Rangely CO 81648 303-675-8667
TWT EXPL INC P O Box 1329 Park City UT 84060 801-649-8212

U

UNDERWATER GAS DEVELOPERS LTD P O Box 428 Port Colborne Ontario L3K 1B7 Canada 416-492-5148
UNDERWOOD OIL WELL SERV INC 731 Lakeshore Dr Monroe LA 71203 318-343-2665
UNION DRLG INC P O Drawer 40 Buckhannon WV 26201 304-472-4610
UNIT DRLG & EXPL CO 1101 Petroleum Club Bldg Tulsa OK 74119 918-582-3188
UNITED DRLG CO OF TYLER Rte 1 Box 294 Hwy 155 N Tyler TX 75708 214-877-3411
UNIVERSAL DRLG CO 14 Sky Ranch Rd Aurora CO 80011 303-341-4912
URC DRLG CORP 2601 Northwest Expy Ste 700 Oklahoma City OK 73112 405-840-2761

V

VECO DRLG INC P O Box 1705 2457 Industrial Blvd Grand Junction CO 81501 303-242-6912
VECO-NANA DRLG CO 5430 Fairbanks St Anchorage AK 99502 907-276-2010
VENTURE DRLG CO P O Box 1353 Cushing OK 74023 918-225-3260
VERNA CORP P O Box 6485 Midland TX 79701 915-563-4856
VI-ROI DRLG CO P O Box 1624 Duncan OK 73533 405-255-4660
VIERSEN & COCHRAN DRLG CO P O Box 19227 Oklahoma City OK 73144 405-681-6611

W

WEK DRLG CO P O Box 1498 Roswell NM 88201 505-623-5070
WES CORP 5710 W Yellowstone Casper WY 82601 307-234-0669
WAKEFIELD EARL F INC 300 W Douglas Ste 500 Wichita KS 67202 316-264-2366
WARREN INTERSTATE DRLG CO 906 Utica Tower Tulsa OK 74104
WARRIOR DRLG & ENGR CO 4200 Crabbe Rd Hwy 69 N Northport AL 35476 205-339-9700
WARRIOR DRLG CO 5015 N Pennsylvania Oklahoma City OK 73112 405-840-1783
WARRIOR DRLG INC 905 Century Plaza Wichita KS 67202 316-262-3791
WARTON DRLG CO P O Box 3747 Odessa TX 79760 915-362-0251
WEAL DRLG CO P O Box 140 Carmi IL 62821 618-382-7713
WELSH DRLG & SERV INC P O Box 45858 Houston TX 77045 713-433-4551
WES-MOR DRLG INC P O Box 1169 Graham TX 76046 817-549-3383
[illegible]S-TEX DRLG CO P O Box 2895 Abilene TX 79604 915-677-9121
WESTBURNE DRLG CANADA LTD 200 535 Seventh Ave SW Calgary Alberta T2B 0Y4 Canada 403-233-6600
WESTBURNE DRLG INC P O Box 13079 Denver CO 80202 303-623-8800
WESTERN WELL DRLG INC 11299 Brighton Rd Henderson CO 80640 303-288-2247
WHELESS DRLG CO 920 Commercial Natl Bank Bldg Shreveport LA 71101 318-222-3137
WHITE & ELLIS DRLG INC P O Box 448 El Dorado KS 67042 316-263-1102

Petroleum Engineer INTERNATIONAL

Drilling Contractors With Rotary Land Rigs In U.S.

W (Contd)

WHITEHEAD E E DRLG CONTR P O Box 1255 Drumright OK 74030 918-352-2230
WILCOX DRILLERS INC P O Box F F Natchez MS 39120 601-446-5021
WILLBROS DRLG INC 5502 W Industrial Midland TX 79703 915-697-3166
WILLIS DRLG CO P O Box 479 Edinburg TX 78539 512-383-3888
WILSON BROS DRLG CO P O Drawer 53628 Lafayette LA 70505 318-233-5950
WINTER DRLG & EXPL CO Rte 1 Box 11-A Nowata OK 74048 918-273-1874
WOOLF & MAGEE INC P O Box 6566 Tyler TX 75711 214-561-4051
WYOMING WELL SERV INC P O Box 350 Cody WY 82414 307-587-4249

X

XPLOR DRLG CO P O Box 18611 Wichita KS 67207 316-685-5372

Y

YOUNG DRLG CO P O Box 717 Bloomfield Hwy Farmington NM 87401 505-327-5218

Z

ZENITH DRLG CORP Fourth Financial Center Ste 505 Wichita KS 67202 316-265-6697

U.S. Contract Rotary Land Drilling Rigs

ALABAMA

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
UNDESIGNATED						
Warrior Drlg & Engr	1	dsl	568	Emsco 350-GA	700	9,000
BALDWIN						
Exeter Drlg Southern	26	dsl	2500	95 Brewster	2500	17,500
Warrior Drlg & Engr	9	dsl	1000	National 100	1350	15,000
CHOCTAW						
Noble Drlg	E-1102	dsl	1870	Emsco A-1100	1870	18,000
Tesoro Drlg	1	dsl	2300	National 130-M	2742	20,000
ESCAMBIA						
Goldrus Drlg	6	dsl-elec	3400	OILWELL E-2000	1700	20,000
FAYETTE						
Rapad Drlg	5	dsl	950	National 370	11500	11,500
Warrior Drlg & Engr	12	dsl	300	Cabot/Franks 1287	320	5,000
	4	dsl	145	Cardwell M-K	600	4,000
	8	dsl	300	Wilson Super 38	150	5,000
LAMAR						
Apollo Drlg & Expl	5	dsl	500	National 370	550	9,000
Warrior Drlg & Engr	11	dsl	750	EMSCO	600	8,500
	3	dsl	600	Gar-Den GD-500	600	9,650
	7	dsl	700	Brewster N-4	300	7,000
MOBILE						
Noble Drlg	N-131	dsl	2130	National 130	2130	18,000
	25	dsl	3300	National 1625-DE	3135	30,000
Penrod Drlg	9	dsl	2600	National 1320-M	3425	25,000

ALASKA

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
UNDESIGNATED						
Nabors Alaska Drlg	1	cat	1700	EMSCO A-800	1650	15,000
	1-ES	dsl-elec	500	EMSCO Electro-hoist C-II	2400	20,000
	17	dsl	2000	OILWELL 860	2475	19,000
	18-E	dsl-elec	2000	EMSCO Electro-hoist	3200	25,000
	22-E	dsl-elec	3200	EMSCO II-C Electrohoist	3200	25,000
	25	dsl	2000	National 110	2475	20,000
	26-E	dsl-elec	3200	EMSCO Electro-hoist	4000	25,000
	27-E	dsl-elec	3200	EMSCO Electro-hoist	4000	25,000
Veco-Nana Drlg	4	dsl-elec	3200	Gar-Den 1500-E	2000	20,000
ARCTIC NORTH SLOPE						
Parker Drlg	147	dsl	1500	OIME TBA-2000	1700	20,000
NATIONAL PETROLEUM RESERVE						
Parker Drlg	95	dsl	2250	National 130	2250	25,000
NORTH SLOPE						
Brinkerhoff-Signal	36	dsl	2100	National 110	2100	18,000
	54	dsl-elec	2325	National 110-UE	2325	18,000
Parker Drlg	123-HH/12	dsl	1200	OIME SL-1500	1800	17,000
	128-HH	dsl	1100	OIME TBA-2000	1100	20,000
	135-HH/23	dsl	1500	OIME TBA-2000	1700	20,000
	141	dsl	1250	OIME TBA-2000	1800	20,000
	176	elec	2600	OIME 2000-E	3600	20,000
	191	dsl	4000	OIME 3000-E	4000	30,000
	96	dsl	2250	National 130	2250	25,000
	97	dsl	1500	National 80-B	1500	15,000
Rowan Drlg US	34	dsl-elec	2000	National 110-EH Special	3000	17,000
	35	dsl-elec	2000	National 110-EH Special	3000	17,000
	26	dsl	2000	National 110	1590	18,000
	29	dsl	1850	National 110	2400	20,000
Veco-Nana Drlg	1	dsl-elec	2000	OILWELL 840-E	2000	20,000
	2	dsl	3200	OILWELL 2000	1600	25,000
	3	dsl	3200	OILWELL 2000	1600	25,000

ALASKA (Cont'd)

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
POINT THOMPSON						
Loffland Bros	162	dsl	2160	National 110	2400	20,000

ARIZONA

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
COSHISE						
Parker Drlg	166	elec	3000	OIME 3000-E	3000	30,000
PINAL						
Morrow Drlg	1	dsl	1360	Cabot/Franks 1287	350	4,000

ARKANSAS

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
UNDESIGNATED						
Shula Drlg	3	dsl	300	Wilson Mogul	325	5,000
COLUMBIA						
Kern Drlg	2	gas	500	EMSCO GB-350	500	8,500
	5	dsl	1050	OILWELL 76	1050	11,500
Lama Drlg	10	dsl	600	10 Wilson Mogul	600	8,000
N & C Drlg	2	dsl	2000	OIME SL-1000	1200	15,000
Noble Drlg	N-81	dsl	1420	National 80	1420	14,000
Sawyer Drlg & Serv	4	dsl	1000	Brewster N-7	1000	12,500
Shuler Drlg	4	dsl	600	EMSCO GB-350	600	8,000
SH & J Drlg	1	dsl	807	Cardwell O	800	10,000
	2	btne	885	Brewster N-7	750	9,500
	3	dsl	807			7,300
CRAWFORD						
Unit Drlg & Expl	5	dsl	950	Unit U-15	600	10,000
FRANKLIN						
Miller Drlg	101	gas	450	National 50	450	7,000
	103	gas	600	National 50	600	10,000
	104	gas	450	National 50	450	8,000
	105	gas	300	Brewster N-3	145	3,800
	112	dsl	350	Spencer 6000	300	6,000
JOHNSON						
Miller Drlg	111	dsl	350	Spencer 5000	300	6,000/3½"
	118	dsl	300	M-CSCO U-34	350	7,000
LAFAYETTE						
Kern Drlg	1	dsl	350	EMSCO GB-250-T	350	6,500
	7	dsl	1020	OILWELL 76	1020	12,500
Layton Oil	8	dsl	450	Cooper	300	6,500/3½"
Owen Drlg	7	dsl	635	Ideco H-35	504	5,000
Shuler Drlg	6	dsl	600	Wilson Giant	600	8,000
LOGAN						
Astro Drlg	18	dsl	556	Ideco H-1000	940	12,000
	23	dsl	1050	Cabot/Franks 2550	1040	15,000
Miller Drlg	117	dsl	1000	OIME SL7	1500	20,000
Tierra Drlg	6	dsl	850	Brewster	800	8,000
MILLER						
Gibson Drlg	6	dsl	506	Wilson Mogul 42	318	5,000
Murco Drlg	34	dsl	2200	OILWELL N-760	1350	15,000
Shuler Drlg	5	dsl	325	Bethlehem	350	5,000
Transcontinental Drlg	22	dsl	750	Brewster N-7	750	11,000
MISSISSIPPI						
Parker Drlg	162	dsl	2200	OIME SL-1500-P	2200	20,000
OUACHITA						
Shuler Drlg	1	dsl	300	Spencer	325	5,000
POPE						
Miller Drlg	15	dsl	600	Spencer	600	8,500
OUACHITA						
Hatcher & Son H F	3	gas	250	Wilson Mogul 42	225	5,000
SEBASTIAN						
Miller Drlg	107	gas	450	Unit 15	450	8,500

ARKANSAS (Cont'd)

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
SEBASTIAN (Contd)						
Miller Drlg	108	gas	450	M-CSCO U-15	450	8,000
Unit Drlg & Expl	16	dsl	1000	M-CSCO U-15	950	12,000
UNION						
New & Hughes Drlg	3	dsl	450	Spencer 6000	550	7,000
Shuler Drlg	8	dsl	450	Spencer 7000	400	7,000

CALIFORNIA

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
UNDESIGNATED						
Atlantic Oil	10	dsl	680	National T-32	370	6,000
	11	gas		National 80	1350	14,000
	12	dsl	850	National 50-A	680	9,000
	14	dsl		Ideco H		5,000
	15	dsl	680	National T-32	340	6,000
	16	dsl	1000	National 130	2475	20,000
	2	gas	1260	National 55	1260	11,000
	3	dsl	680	Ideco H-40	370	5,500
	4	gas	900	National 55	900	10,000
	5	dsl	680	National 50-A	680	9,000
	6	gas		National 80	1680	14,000
	7	gas	650	National T-32	450	6,000
	8	gas	650	National T-32	370	6,000
Bawden Peter Drlg	12	dsl	1700	EMSCO A-800-WE	1000	15,000
Gary Drlg	15	dsl	800	Gary	640	9,000
MHC Drlg	1	dsl	950	National T-32	320	9,000/3½"
Montgomery Drlg	41	scr	1350	National 1320-UE	2000	23,000
Repco	2-H	dsl	636	Hopper	440	6,100
COLUS						
MHC Drlg	2	dsl	1520	OILWELL 660	880	12,500/4"
COLUSA						
Bawden Peter Drlg	22	dsl-elec	1400	EMSCO M-58	800	10,000
MHC Drlg	5	dsl	960	Ideco 525	480	9,000/4"
Owens Jack Serv	5	dsl	300	Ideco H-25	300	4,000
FRESNO						
Loffland Bros	16	dsl	1425	M-CSCO U-914-C	1600	18,000
Montgomery Drlg	1	dsl-elec	3200	National 1320-UE	3645	25,000/5"
Scandinavian Montgomery Drlg	11	dsl	1000	EMSCO GB-800	1000	12,000/5"
GLENN						
Owens Jack Serv	2	dsl	200	Ideco H-38	350	4,000
	6	dsl	300	Ideco H-35	300	4,000
KERN						
Barnes Core Drlg	711-D	dsl	750	Howard-Turner 5500	450	5,500
Bawden Drlg	50	dsl	1500	National 55		12,000
Bawden Peter Drlg	10	dsl-elec	1500	OILWELL 940-E	1500	14,000
	11	dsl-elec	1706	EMSCO A-800-WE	1000	12,000
Big-O Drlg	2	dsl	1200	National 75-CA	1200	10,500
	3	dsl	1100	National 100	1650	13,500
Brea Drlg	1	dsl	165	Howard-Turner	165	2,500
Cactus Drlg Ltd	29	dsl	500	EMSCO GA-500	9000	
California Prod Serv	M-17	dsl	300	Cardwell K-200-C	308	4,000
Cleveland Drlg	1	dsl	1200	OILWELL 96	1200	18,000
	2	dsl	600	Brewster RR-400	450	5,000
Dahlquist Drlg	1	dsl	300	Tomson 3000	250	2,500
	5	dsl	300	Failing 2000	160	1,600
Edwards Well Serv	D-30	dsl		Ideco	300	
Gary Drlg	D-12	dsl	382	EMSCO GB-160-T	300	4,500
	D-13	dsl	450	EMSCO GB-16-T	300	4,000
	D-3	dsl	628	EMSCO G-350	600	8,000
	D-30	dsl	300	Ideco 35		
	D-4	dsl	475	EMSCO GB-160-T	450	4,500
	D-5	dsl	382	Hooper GT-34	300	2,500
	D-6	dsl	600	EMSCO GB-160-T	400	4,500
	D-7	dsl	381	Gary	200	2,000
	D-8	dsl	450	EMSCO GB-160-T	400	4,500
	D-9	dsl	628	Cabot/Franks	400	5,500
	1	dsl	450	Hooper	400	5,000
	14	dsl	800	Gary	640	9,000
Golden State Drlg	D-10	dsl	750	Custom Howard-Turner	450	5,500
	D-6	dsl	750	Custom Howard-Turner	450	5,500
	D-8	dsl	750	Challenger 78	450	5,500
Hylton Drlg	1	dsl	380	National T-12	300	4,000
	4	dsl	380	Howard-Turner MR-10	150	3,000
	5	dsl	380	Ideco H-30	300	5,000
	7	dsl	300	National T-12	380	4,000
	8	dsl	380	Ideco H-30	300	5,000
Kenai Drlg West Coast	34	dsl	950	EMSCO GB-350	800	9,000
	8	dsl	875	Wagner-Morehouse T-5054	400	7,000
Loffland Bros	185	gas	1600	M-CSCO U-914-C	1900	17,000
Marlin West	Marlin 11	dsl-elec	2000	National 110	1600	14,000
	Marlin 12	dsl-elec	2000	National 110	1600	14,000
Montgomery Drlg	14	dsl	1200	OILWELL 66	700	10,500/5"
	17	dsl-elec	2000	OILWELL 940-E	2000	20,000/5"
NECK Drlg	1	gas	350	Wilson Super	350	4,000
	2	gas	450	Wagner-Morehouse	450	6,000
Pyramid Oil	15	dsl	400	Ideco H-30	300	3,000

CALIFORNIA (Cont'd)

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
KERN (Contd)						
Scandinavian Montgomery Drlg	3	dsl	1200	National 75	700	1,200/5"
	8	dsl	1200	National 75	700	1,200/5"
	9	dsl-elec	2200	National 1320-UE	3000	22,000/5"
KING						
MHC Drlg	4	dsl	960	OILWELL 66	640	11,000/4"
KINGS						
Montgomery Drlg	4	dsl	2000	OILWELL 96	1500	18,000/5"
LAKE						
Montgomery Drlg	6	dsl	1400	EMSCO GB-800	1200	13,000/5"
LOS ANGELES						
Bawden Drlg	24	dsl-elec	1550	National 80-E	1000	14,000
	38	dsl	2100	OILWELL 940-E	1500	8,500
Big Chief Drlg	18	dsl	500	Hooper GXXTA	450	6,000
Big-O Drlg	1	dsl	1200	OILWELL 66	800	9,500
	4	dsl	1100	National 75-CA	900	12,500
California Prod Serv	D-3	dsl	300	Ideco H-37-D	461	4,500
	D-4	dsl	500	Hooper MTA	461	4,500
	D-6	dsl	500	Hooper MTA	461	4,500
	D-7	dsl	1000	Hooper MTA	654	6,500
Finley Oilwell Serv	11	dsl	736	Ideco H-30	318	3,500
	6	dsl	736	Ideco H-40	475	5,500
Gary Drlg	D-2	dsl	800	National T-45	600	9,000
Kellogg K L & Sons	40	elec	1000	National 610	700	11,000
	41	elec	1000	National Con 75-CA	700	11,000
Kenai Drlg West Coast	30	dsl	800	Ideco H-40	400	6,500
MHC Drlg	6	dsl-elec	950	National 110	950	18,000
Pool Well Serv	38	dsl	520	Cabot/Franks 550	550	5,500
MONTEREY						
Gary Drlg	D-10	dsl	628	Hooper	400	5,500
Melton Drlg	3	dsl	350	Wagner-Morehouse	350	4,000
ORANGE						
Finley Oilwell Serv	17	dsl	736	Cabot/Franks 1287	636	7,000
Kenai Drlg West Coast	24	dsl-elec	1500	Wilson Titan	1000	13,000
Loffland Bros	125	dsl-elec	2000	M-CSCO U-914	2000	18,000
	92	dsl-elec	2160	M-CSCO U-914-CE	2200	18,000
Montgomery Drlg	15	dsl-elec	2000	National 75-CB	1000	14,000
Petrowell Corp	1	dsl	736	Ideco H-30	318	3,500
Thompson Drlg	2	dsl	900	EMSCO GA-250-T	450	6,500
SAN LUIS OBISPO						
Big-O Drlg	5	dsl-elec	3200	Ideco Super 711	1600	18,000
SANTA BARBARA						
Challenger Drlg	30-E	dsl-elec	3000	National 1320-UE	2400	25,000
Kenai Drlg West Coast	29	dsl	900	Wilson Giant	1200	10,000
	4	dsl	800	Ideco H-40-D	400	6,500
	5	dsl	800	National T-32	400	7,000
	7	dsl	800	Unit U-10	400	7,000
	9	dsl	800	Ideco H-400	400	6,500
Loffland Bros	232	dsl	1000	M-CSCO U-15	1000	12,000
SONOMA						
Loffland Bros	105	dsl-elec	2160	M-CSCO U-914-EC	2200	18,000
	25	dsl-elec	2000	M-CSCO U-924-CE	2000	18,000
	27	dsl-elec	2160	M-CSCO U-20	2400	18,000
	50	dsl-elec	1420	M-CSCO U-712-A	1600	17,000
STOCKTON						
Owens Jack Serv	4	dsl	300	Ideco H-35	150	4,000
SUTTER						
MHC Drlg	3	dsl	960	National CA-50	640	10,500/4"
VENTURA						
Bawden Peter Drlg	27	dsl-elec	1500	EMSCO 550-WE	750	12,000
California Prod Serv	D-1	dsl	500	Hooper GXXTA	461	4,000
Gary Drlg	D-11	dsl	600	EMSCO C-50	600	8,000
Loffland Bros	212	gas	1420	M-CSCO U-914-A	1600	18,000
	217	gas	1600	M-CSCO U-914-C	1900	18,000
	64	dsl-elec	1700	M-CSCO U-36-EA	1200	11,000
Republic Drlg	6	dsl	1800	Brewster N-95	1800	18,000

COLORADO

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
UNDESIGNATED						
Comanche Drlg Ltd	10	dsl	650	Brewster N-45	650	8,000
	7	dsl	325	EMSCO GB-350	650	8,600
ADAMS						
Allison Drlg	25	dsl	435	Gar-Den 500	435	10,000
Exeter Drlg Northern	23	dsl	500	M-CSCO U-15	720	8,700
Toltek Drlg	1	dsl	440	Brewster N-4	440	7,000
	2	dsl	680	National 50-A	875	9,000
Westburne Drlg	66	dsl	1200	Gar-Den 1100	1500	18,000
ARAPAHOE						
Allison Bros Drlg	1	dsl	320	Ideco BIR-800	920	10,000
BACA						
Sage Drlg	1	dsl	400	National T-32	400	6,500
BOULDER						
Exeter Drlg Northern	40	dsl	500	M-CSCO U-15	750	9,500
CHEYENNE						
Allison Drlg	15	dsl	720	Brewster N-7	720	10,000

COLORADO (Cont'd)

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
CHEYENNE (Contd)						
Murfin Drlg	14	dsl	400	T-45	700	8,000
DOLORES						
Arapahoe Drlg	11	gas-btne	300	National T-32	320	9,000
Loffland Bros	211	dsl	1260	M-CSCO U-15	1000	10,000
ELBERT						
Exeter Drlg Northern	1	dsl	500	National 50-A	750	9,500
GARFIELD						
Loffland Bros	12	dsl	840	Ideco Hydrair H-44-CSC	868	8,000
Nicor Drlg	38	dsl	750	Wilson 75	640	9,000/4"
	39	dsl	700	National D-300	300	5,000/3½"
GRAND JUNCTION						
Shelby Drlg	3	dsl	400	Cabot/Franks	425	7,500
LA PLATA						
Arapahoe Drlg	10	gas-btne	700	National 50-A	500	12,000
Cactus Drlg Corp	5	dsl	1000	National 75	1180	12,000
Coleman Drlg	2	dsl	1100	Ideco H-40-D	636	8,000
	3	dsl	900	Ideco H-44-CSC	636	8,000
Four Corners Drlg	3	dsl	750	Cardwell KB-500	700	8,000
Young Drlg	4	dsl	400	Cardwell K-500	600	8,500
LARIMER						
Exeter Drlg Northern	6	dsl	330	National T-20	300	6,000
LOGAN						
Allison Drlg	3	dsl	360	Cardwell KB-500	380	7,500
Toltek Drlg	3	dsl	680	Brewster N-4	440	8,000
MESA						
Calvert Western Expl	9	dsl	900	National 300-B	350	5,000
Nicor Drlg	37	dsl	850	Failing Stratmaster	340	7,000/3 "
Veco Drlg	1	dsl	400	Failing 90	400	5,000
	2	dsl	425	Mayhew 5000	500	7,000
	3	dsl	850	M-CSCO U-36-A	700	9,000
	5	dsl	1400	OIME 750	750	11,000
	6	dsl	1400	OIME 750	750	11,000
	9	dsl	1200	Ideco 725	750	11,000
Westburne Drlg	52	dsl	1650	National Ideal 110	1830	18,000/5"
MOFFAT						
Loffland Bros	186	dsl	2160	M-CSCO U-914-C	2400	20,000
MONTEZUMA						
Coleman Drlg	4	dsl	1300	Brewster MOD-N-46	930	10,000
Loffland Bros	29	dsl-elec	1400	M-CSCO U-36-A	1600	11,000
MORGAN						
Allison Bros Drlg	2	dsl	360	Cardwell KB-500	380	7,500
Gibson J W Well Serv	75	dsl	450	Cardwell K-8500	450	8,000
	84	dsl	550	Cabot/Franks 2042	700	10,000
	93	dsl	450	Cabot/Franks M-1287	450	6,000
PROWERS						
Murfin Drlg	12	dsl	375	Bethlehem C-50	600	7,500
RIO BLANCO						
Manning R L	10	dsl		OILWELL 660	720	10,000
	11	dsl	720	National 370	720	8,500
	19	gas-btne	925	Bethlehem M-58	910	10,000
	23	dsl	800	Brewster N-45	654	7,500
	9	dsl	650	EMSCO GA-500	650	9,000
Nicor Drlg	36	dsl	1150	Gar-Den 500	650	11,000
	57	dsl	925	National T-45	550	10,600
Tierra Drlg	16	dsl	650	Brewster 4610	750	10,000
Twin Arrow	306			Cardwell		4,500
	309			Brewster		6,000
Veco Drlg	7	dsl	1550	OIME 1000	1000	16,000
SAN MIGUEL						
Brinkerhoff-Signal	76	dsl	800	Gar-Den M-500	800	10,000
WASHINGTON						
Exeter Drlg Northern	13	dsl	350	Brewster N-4	300	6,000
Toltek Drlg	4	dsl	440	Unit U-34	440	7,000
Western Well Drlg	2	dsl	350	Failing H-2000	350	3,500
WELD						
Exeter Drlg Northern	2	dsl	375	EMSCO GA-250	460	7,500
	12	dsl	500	National T-45	750	9,500
	14	dsl	375	Bethlehem C-50	460	7,500
	22	dsl	500	M-CSCO U-15	750	9,500
	25	dsl	375	M-CSCO U-15	480	8,500
	5	dsl	300	M-CSCO U-34-D	300	6,000
YUMA						
Excell Drlg	1	dsl	420	671 GMC	210	4,200
	2	dsl	375	671 GMC	210	3,300

FLORIDA

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
UNDESIGNATED						
Penrod Drlg	108	dsl	1000	National 80-B	1760	15,000
COLLIER						
Penrod Drlg	14	dsl	3075	Brewster N-12-A	1840	20,000
ESCAMBIA						
Delta Drlg	56	dsl	2600	Wilson Super 250	2592	25,000

FLORIDA (Cont'd)

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
SANTA ROSA						
Penrod Drlg	15	dsl	3000	Gar-Den 2100	2200	30,000
	19	dsl	2600	National 1320-M	3425	25,000
	2	dsl	2600	EMSCO C-2	3425	25,000
TAYLOR						
Delta Drlg	66	dsl-elec	2300	EMSCO Electro-hoist II	3456	18,000

GEORGIA

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
GLYNN						
Crescent Drlg	1	dsl	400	Bethlehem S-45-E	400	7,000
JEFFERSON DAVIS						
Penrod Drlg	16	dsl	3075	Brewster N-12-A	1040	20,000

IDAHO

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
CARIBOU						
Loffland Bros	57	dsl-elec	1800	National 80-B	2000	16,000

ILLINOIS

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
UNDESIGNATED						
Gallagher Drlg	5	dsl	300	National T-12	310	3,500
Maz-Kar Oil	1	dsl				4,000
PEP Drlg	6	dsl	470	Ideco H-35-S	470	6,500
CLAY						
Barr Drlg	1	dsl	378	National T-12	286	5,000/3½"
Precision Expl	4	dsl	400	National T-20	400	5,500
COOK						
Drillers	S-1	dsl-hydra	400	Shaft SCD-830	400	2,000
CRAWFORD						
Nicor Drlg	20	gas	175	Failing 2500	260	2,500
EDWARDS						
Mitchell Geo N Drlg	6	dsl	400	Wilson 38	400	4,000
Precision Expl	5	dsl	400	National T-12	385	4,500
Ram Drlg	1	dsl	1800	Ideco HD-35	1800	6,500
	2	dsl	1800	National T-12	1800	5,000
FAYETTE						
Smith Drlg	7	dsl	450	Gar-Den 2500	350	3,500/3½"
JASPER						
Precision Expl	3	dsl	400	National T-16	400	6,500/3½"
RICHLAND						
Mitchell Geo N Drlg	1	dsl	400	S-45-A	400	6,000
Precision Expl	1	dsl	400	National T-20	400	6,500/3½"
SALINE						
Big Seven Drlg	11	dsl	300	EMSCO GB-160	300	4,000
Mitchell Geo N Drlg	4	dsl	400	Brewster N-4	400	6,000
WABASH						
Beard Drlg	1	dsl	400	National T-12	350	4,500
WAYNE						
J-V Drlg	6	dsl	145	Speedstar SS-15-S	145	1,600/2⅞"
Mitchell Geo N Drlg	5	dsl	400	Brewster N-4	400	6,000
Precision Expl	2	dsl	400	National T-20	400	6,500/3½"
Royco Drlg	2	dsl	300	Gar-Den 3000	200	5,000/3½"
Smith Drlg	11	dsl	450	National T-20	480	6,000
	9	dsl	320	National T-12	320	4,000
WHITE						
Big Seven Drlg	7	dsl	300	EMSCO GB-250	380	6,000
Harris Drlg	1		3660	National T-12	320	4,000
	4	dsl	500	National 50	360	6,000
Kendall Drlg	2	dsl	400	Brewster N-4	360	5,500
Mitchell Geo N Drlg	7	dsl	400	Ideco 35	400	6,500
	8	dsl	400	Mack 300	250	3,500
Ram Drlg	3	dsl	360	National T-12	360	4,500
Snyder Drlg Well Serv	1	dsl	350	Brewster N-4	350	6,000
	2	dsl	365	Bethlehem 545	325	6,500

INDIANA

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
UNDESIGNATED						
Gallagher Drlg	6	dsl	520	Cardwell Model O	970	12,000
KNOX						
Gwaltney Drlg	1	dsl	200	National T-12	165	3,000
Smith Drlg	2	dsl	350	National T-8	238	2,500/3½"
POSEY						
Gallagher Drlg	4	dsl	500	Bethlehem S-45-E	476	6,000
Kendall Drlg	3	dsl	300	Brewster N-4	300	5,500
Royco Drlg	1	dsl	300	Cardwell	335	5,500
WARRICK						
J-V Drlg	9	gas	85	Cabot/Franks F	85	600/2⅜"

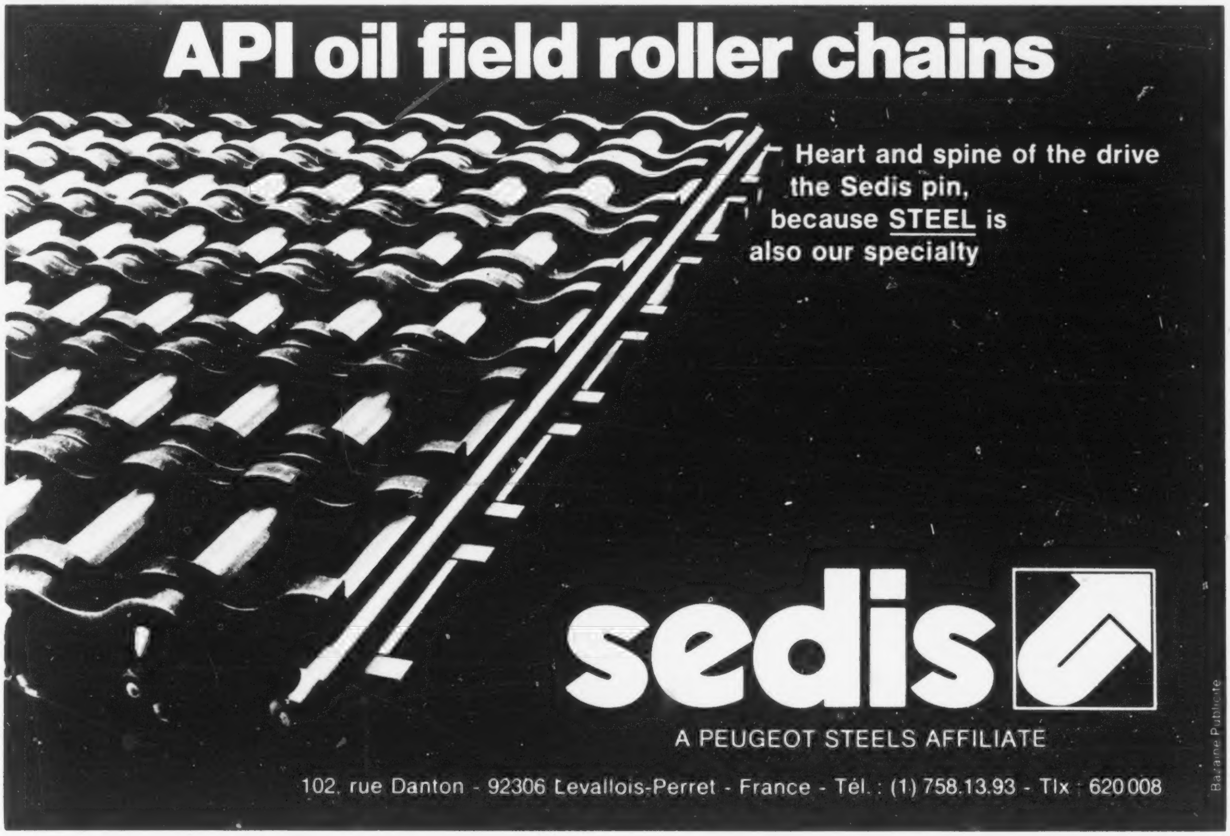
KANSAS

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
UNDESIGNATED						
Allen Drlg	1	dsl	476	National T-32	476	6,000
Big Springs Drlg	1	dsl	360	Bethlehem S-45-13	360	5,000
	2	dsl	360	National T-32	360	5,500
Rains & Williamson Oil	7	dsl	360	Brewster N-4	460	5,500

KANSAS (Cont'd)

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
UNDESIGNATED (Contd)						
Rains & Williamson Oil	8	dsl	360	Brewster N-R		6,700
ALLEN						
L & R Drlg	6	dsl	318	Cabot/Franks	318	1,500
BARBER						
Abercrombie Drlg	11	dsl	600	EMSCO 350	700	7,500
Damac Drlg	2	dsl	310	Wilson Giant	310	6,000
Dunne-Gardner Petr	3	dsl	400	Challenger	400	6,000
Eagle Drlg Inc	1	dsl	8000	National 370	650	7,000
Graves Drlg	1	dsl	300	Brewster N-4	400	6,000
H-30 Drlg	5	dsl	510	Ideco H-35	510	6,500
Lauck D R Oil	1	dsl	350	M-CSCO U-15	400	6,000
Pickrell Drlg	1	dsl	450	M-CSCO U-15	450	6,500
Slawson Drlg	5	dsl	360	Ideco H-525	480	7,500
Sweetman Drlg	1	dsl	750	National 370	750	9,000
Xplor Drlg	1	dsl	750	National T-32	750	8,500
BARTON						
Abercrombie Drlg	4	dsl	365	Ideco H-35	365	8,500
Bergman Drlg	1	dsl	300	EMSCO	300	5,500
Damac Drlg	7	dsl	385	Brewster N-4	385	5,000
Duke Drlg	1	dsl	375	Unit	375	5,000
	2	dsl	250	National	250	5,000
L D Drlg	1	dsl	410	Bethlehem S-45-A	300	4,600
Peters Drlg	4	dsl	250	Cardwell R-L	250	6,000
	8	dsl	250	Cardwell DB-200	250	6,000
White & Ellis Drlg	8	dsl	535	EMSCO 350	670	7,500
BUTLER						
Range Drlg	1	dsl	360	Cabot/Franks SAL-4500	440	3,500
White & Ellis Drlg	3	dsl		National T-12		
	4	dsl		EMSCO GA-250		
	5	dsl		EMSCO GA-150		
CLARK						
Gabbert-Jones	3	dsl	550	EMSCO 350	550	7,000
Rains & Williamson Oil	5	dsl	360	Ideco H-40	400	7,000
COMANCHE						
H-30 Drlg	77	dsl	375	Ideco H-40	525	8,000
Simmons Drlg	40	dsl	375	Ideco H-40	350	6,000
COWLEY						
Edco Drlg	5	dsl	475	Cardwell KB-200	375	4,500
	6	dsl	375	Cardwell KB-150	318	3,500
Range Drlg	2	dsl	350	Wilson Giant	350	5,500
White & Ellis Drlg	7	dsl	335	Unit U-34	425	4,000
DECATUR						
Abercrombie Drlg	10	dsl	365	Cabot/Franks Trl Mtd	220	4,500
	9	dsl	365	Bethlehem Breeze	365	5,500
Murfin Drlg	7	dsl	525	National T-32	400	5,000
EDWARDS						
Damac Drlg	5	dsl	310	Ideco DIR H-35	310	5,000
Lauck D R Oil	2	dsl	350	Brewster N-45	400	6,000
Sterling Drlg (KS)	1	dsl	350	M-CSCO U-34	285	4,600
	4	dsl	450	M-CSCO U-15	285	5,000
White & Ellis Drlg	9	dsl	535	Brewster N-46	950	10,500
ELLIS						
Abercrombie Drlg	1	dsl	365	M-CSCO U-34	365	5,000
	8	dsl	365	Bethlehem S-50	365	5,500
Buffalo Drlg	1	dsl	500	Brewster N-4	400	6,000
C & R Drlg	1	dsl	425	National 370	425	7,500
Dreiling Oil	1	dsl	320	Bethlehem C-50	440	6,000
	3	dsl	320	Brewster N-4	320	4,500
Murfin Drlg	15	dsl	400	National T-20	400	5,000
Nixon R P	3	dsl	3406	Wilson Model 42	825	6,000
Red Tiger Drlg	5	dsl	700	Unit U-15	700	6,000
White & Ellis Drlg	10	dsl	375	Bethlehem S-45	350	5,000
ELLSWORTH						
Red Tiger Drlg	3	dsl	700	Ideco H-35	700	5,500
FINNEY						
DNB Drlg	1	dsl	450	OILWELL 52-T	450	6,500
Service Drlg (OK)	1	dsl	300	Unit R-U34	400	5,500
	10	dsl	300	Unit R-U34	400	5,500
Wakefield Earl F	1	dsl	440	M-CSCO U-34	440	5,000
	7	dsl	640	EMSCO Gb-160-T	640	5,000
GOVE						
Simmons Drlg	31	dsl	350	Spencer 6000	350	6,500
Slawson Drlg	3	dsl	480	Ideco H-35	480	7,000
GRAHAM						
Farmer John O	4	dsl	400	Ideco H-30	400	6,000
Murfin Drlg	21	dsl	375	Ideco H-35	475	6,500
Red Tiger Drlg	7	dsl	700	EMSCO GA-250-T	700	5,000
	8	dsl	700	EMSCO GA-250-T	700	5,000
	9	dsl	700	Unit U-10	700	6,000
GRAY						
Slawson Drlg	6	dsl	360	Ideco H-525	480	7,500
	7	dsl	480	Ideco H-35	480	7,500
GREENWOOD						
Edco Drlg	1	dsl	375	Sullivan A-1300	318	3,000
	2	dsl	318	Sullivan 318	375	3,000
GREENWOOD (Contd)						
Edco Drlg	3	dsl	125	Cardwell J-101	235	750
	4	dsl	125	Davey	235	750
HAMILTON						
Service Drlg (OK)	2	dsl	300	Unit R-U34	450	5,500
HARPER						
Slawson Drlg	4	dsl	6500	Ideco H-30	360	7,500
HASKELL						
Damac Drlg	6	dsl	550	Cabot/Franks BIR-550	450	6,000
HODGEMAN						
Dunne-Gardner Petr	1	dsl	350	EMSCO 250	350	5,000
H-30 Drlg	11	dsl	375	Ideco H-30	375	5,500
Rains & Williamson Oil	2	dsl	360	OILWELL 52-T	400	6,700
Strata Drlg	1	dsl	500	M-CSCO U-15	520	7,500
KEARNY						
Service Drlg (TX)	2	dsl	454	M-CSCO U-34	454	6,000
KINGMAN						
Brandt Drlg	2	dsl	350	National 370	600	5,500
H-30 Drlg	3	dsl	375	Ideco H-40	575	8,000
Sterling Drlg (KS)	5	dsl	350	EMSCO GB-350	600	7,000
KIOWA						
Gabbert-Jones	6	dsl	275	National T-32	275	5,500
	9	dsl	275	National T-32	310	5,500
Red Tiger Drlg	6	dsl	700	Ideco H-35	700	5,500
LANE						
Abercrombie Drlg	12	dsl	365	Bethlehem Freeze	300	5,500
C-G Drlg	1	dsl	300	National T-32	300	5,000
LEAVENWORTH						
Berentz Drlg	1	dsl	350	National T-12	325	3,500
MC PHERSON						
Blackstone Drlg	2	dsl	300	National T-20	300	4,000
	3	dsl	300	450-T BDW	300	5,000
MARION						
Dakota Drillers	1	dsl	1500	Gar-Den	250	1,500/2½"
Kan-Go	K3-B	dsl	365	Cabot/Franks	300	4,000
MARTIN						
Lohmann-Johnson Drlg	3	dsl	300	National 50	450	5,500
MEADE						
Sage Drlg	2	dsl	400	OILWELL T-52	400	6,700
	7	dsl	400	BDW 450	400	8,000
Search Drlg	1	dsl	640	National T-32	640	6,000
Zenith Drlg	7	dsl	550	Brewster N-4	500	7,000
MEADS						
Service Drlg (OK)	5	dsl	1000	Unit R-U15	800	10,500
MONTGOMERY						
Centennial Expl & Drlg	CP-650	dsl	250			1,200
Layton Oil	1	dsl	150	Wilson	100	1,500
	6	dsl	250	Wilson Double Drum	250	3,000/2⅞"
Winter Drlg & Expl	2	dsl	900	Jaswell J-2400	900	2,400
MORTON						
Service Drlg (TX)	10	dsl	454	M-CSCO	450	5,500
NEOSHO						
Carter Land & Cattle	1	dsl	250	Gar-Den 1000	350	1,000
	2	dsl	250	Gar-Den 1000	350	1,000
	3	dsl	250	Gar-Den 1000	350	1,000
NESS						
DNB Drlg	2	dsl	500	National T-32	450	6,500
Pickrell Drlg	10	dsl	370	M-CSCO U-15	370	5,500
Slawson Drlg	1	dsl	360	Ideco H-35	360	5,500
PAWNEE						
Dunne-Gardner Petr	2	dsl	400	Ideco H-35	400	7,000
Red Tiger Drlg	4	dsl	700	EMSCO Gas 250	700	5,000
Sterling Drlg (KS)	8	dsl	350	Gar-Den 2000	350	2,800/3½"
PRATT						
Damac Drlg	1	dsl	350	Wilson Giant	350	5,500
Husky Drlg	1	dsl	270	M-CSCO U-15	270	6,000
Murfin Drlg	22	dsl	600	National 370	600	7,500
Red Tiger Drlg	1	dsl	450	Unit U-15	450	6,000
RAWLINS						
Rains & Williamson Oil	1	dsl	360	Bethlehem S-45-B	400	5,500
RENO						
H-30 Drlg	7	dsl	375	Ideco H-30	375	5,500
RICE						
Banner Drlg	4	dsl	400	Apache 250-40	375	5,000
Rockhold Engr	3	gas		Cardwell RL	150	
ROOKS						
Murfin Drlg	8	dsl	400	National T-20	400	5,000
Red Tiger Drlg	2	dsl	700	EMSCO GA-250	700	5,000
RUSH						
Abercrombie Drlg	6	dsl	365	Ideco H-35	365	6,000
H-30 Drlg	2	dsl	280	Ideco H-40	312	8,000

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
KANSAS (Cont'd)						
RUSSELL						
Abercrombie Drlg	7	dsl	365	M-CSCO U-34	365	5,000
Shields Drlg	2	dsl	300	Bethlehem C-50	300	5,500
SCOTT						
Abercrombie Drlg	5	dsl	750	Ideco 725	600	10,000
Rockhold Engr	7	gas		Walker-Neer	200	
SEDGWICK						
Brandt Drlg	1	dsl	350	Bethlehem S-50	335	4,500/3½"
STAFFORD						
Murfin Drlg	19	dsl	525	Wilson Super Mogul 42	525	6,500
Slavson Drlg	2	dsl	360	Ideco H-525	480	7,500
White & Ellis Drlg	2	dsl	425	EMSCO GA-250	335	4,500
SUMNER						
DNB Drlg	3	dsl	450	National T-20	350	5,000
Rains & Williamson Oil	3	dsl	360	Brewster N-R	400	6,700
Range Drlg	2	dsl	350	Unit 10A	350	5,500
TREGO						
Murfin Drlg	16	dsl	400	EMSCO S-45-E Bethlehem	400	5,000
Rains & Williamson Oil	4	dsl	360	Unit U-34	400	5,500
KENTUCKY						
UNDESIGNATED						
Smith Drlg	12	dsl	450	Challenger M-320	400	5,000
DAVIESS						
Crescent Drlg	4	dsl	400	Bethlehem S-45	400	4,000
HENDERSON						
Crescent Drlg	8	dsl	400	Bethlehem S-45	400	5,000
NRG Drlg	1	dsl	335	National T-12	185	4,500
HOPKINS						
Weal Drlg	1	dsl	325	National T-12	335	4,000
	2	dsl	335	Cardwell S	335	4,000
LETCHER						
Ray Resources	4	dsl	450	Ideco BIR-5525	450	6,000
OHIO						
J-V Drlg	8	dsl	145	Speedstar SS-15-S	145	2,000/2⅞"
KENTUCKY (Cont'd)						
WEBSTER						
Kendall Drlg	1	dsl	300	National T-12	300	3,500
LOUISIANA						
UNDESIGNATED						
American Well Serv & Drlg	15	dsl	1700	Brewster DH1-4610	900	12,000
Comet Drlg	16	dsl-elec	3200	Gar-Den 3000-E	3000	30,000
Eljay Drlg	4	dsl-scr	3400	OILWELL E-3000	3000	30,000
Glendel Drlg	5	dsl-elec	3200	Gar-Den 1100-E	1650	16,000
	6	dsl-elec	3200	Gar-Den 1100-E	1650	16,000
Harris Well Serv	17	dsl	316	Ideco H-35	316	7,500
	18	dsl	316	Ideco H-35	316	7,500
	19	dsl	316	Ideco H-35	316	7,500
	21	dsl	316	Ideco H-35	316	7,500
	22	dsl	316	Ideco H-35	316	7,500
	23	dsl	316	Ideco H-37	480	8,000
	24	dsl	316	Ideco H-35	316	7,500
	25	dsl	632	Ideco H-44	632	10,000
	26	dsl	632	Ideco H-44	750	10,000
	27	dsl	316	Ideco H-35	316	7,500
	28	dsl	316	Ideco H-35	316	7,500
	29	dsl	316	Ideco H-35	316	7,500
	30	dsl	2000	Ideco 1200	1400	13,500
	31	dsl	316	Cooper LTD-350	316	7,500
	32	dsl	316	Ideco H-35	316	7,500
	33	dsl	900	Ideco H-44	900	10,000
Mosley Well Serv	7	dsl		Cabot/F	475	10,000
Murco Drlg	14	dsl-scr	3200	Gar-Den 1500	2800	25,000
Power Rig Drlg	24	dsl-elec	3300	EMSCO C-3	3000	30,000
	25	dsl-elec	2000	Ideco E-1700	2400	16,000
Richards Drlg Assoc	10	dsl-elec	3400	OILWELL E-3000	3000	30,000
	11	dsl	2500	OILWELL 860	2400	18,000
Santa Fe Drlg	120	dsl-elec	3400	EMSCO C-311-E	3000	25,000
	121	dsl-elec	3400	OILWELL 2000-E	3000	25,000
	95	dsl-elec	2800	OILWELL E-2000	1500	20,000
Southland Drlg	14	dsl	2225	EMSCO A-1500	2500	24,000
	16	dsl	1925	Brewster N-12-A	2200	17,000
ACADIA						
Cliffs Drlg	26	dsl	1000	National 110	1000	16,000
Comet Drlg	10	dsl	1600	Cabot/Franks 900	900	10,500



API oil field roller chains

Heart and spine of the drive
the Sedis pin,
because STEEL is
also our specialty

sedis

A PEUGEOT STEELS AFFILIATE

102, rue Danton - 92306 Levallois-Perret - France - Tél. : (1) 758.13.93 - Tlx : 620008

Circle 300 on Reader Service Card

LOUISIANA (Cont'd)

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Avail-able to Drwwks	Rated Depth with 4½" Pipe
ACADIA (Contd)						
Delta Drlg	83	dsl	2600	EMSCO C-1	2331	18,000
	93	dsl-scr	2000	EMSCO D-3	2597	16,000
MGF Drlg-Lafayette	43	dsl	1800	OILWELL 96	1200	18,000
	44	dsl	2000	M-CSCO U-914	1500	17,000
Power Rig Drlg	9	dsl	1850	EMSCO D-3	1450	14,000
Resource Drlg	9	dsl	2330	National 110	2740	18,000
ALLEN						
Circle Bar Drlg	4	dsl	1300	OILWELL 96	1500	15,000
Woolf & Magee	11	dsl	850	Bethlehem S-45	475	9,500
ASCENSION						
Goldrus Drlg	14	dsl-elec	1200	Brewster N-75	1176	13,000
ASSUMPTION						
Cliffs Drlg	16	dsl	1300	National 1320	1300	25,000
Goldrus Drlg	11	dsl	1500	Brewster N-12-A	2000	16,000
Nicklos Drlg	79	dsl-elec				
Wilson Bros Drlg	5	dsl	2600	National 110-M	2700	20,000
AVOYELLES						
Justiss Oil	35	dsl	1250	EMSCO J-1400	1200	18,000
BEAUREGARD						
Glasscock Drlg	63	dsl	2200	National 110	1700	16,000
Goldrus Drlg	16	dsl	1250	Bethlehem MA-810	1176	13,000
	21	dsl	1200	Cabot/Franks 1000	872	13,500/4"
Loffland Bros	103	dsl-elec	3300	M-CSCO U-1220-EBD	3300	30,000
	167	dsl	2160	M-CSCO U-914-C	2400	20,000
Woolf & Magee	12	dsl	850	Ideco H-35-S	475	10,000
BIENVILLE						
Butler Johnson	4	dsl	1200	Brewster N-75	1200	12,500
Justiss Mears	22	dsl	1800	National 80-B	1420	14,000
Noble Drlg	N-59	dsl	800	National 55	800	12,000
Remco Drlg	1	dsl	900	Cabot/Franks 2042	475	10,000
Sawyer Drlg & Serv	1	dsl	700	Brewster N-7	700	11,000
	12	dsl	900	Wilson Giant	900	12,000
	2	dsl	400	Brewster N-4	400	8,500
	8	gas	1100	Brewster N-7	1100	11,500
Wheless Drlg	2	dsl	1200	EMSCO D-2	1200	11,000

LOUISIANA (Cont'd)

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Avail-able to Drwwks	Rated Depth with 4½" Pipe
BOSSIER						
Kern Drlg	4	gas	700	EMSCO GB-500	700	9,500
N & C Drlg	4	dsl	1600	National 610	800	13,000
Paramount Drlg	3	dsl	650	Bethlehem S-45	650	10,000/3½"
	9	dsl	1650	EMSCO EDA	1650	15,000
CADDO						
Lagersen Drlg	6	dsl-elec	2000	EMSCO EIIC	2500	20,000
	7	dsl-elec	2000	EMSCO EIIC	2500	20,000
CALCASIEU						
Goldrus Drlg	4	dsl	1200	Brewster N-75	1040	1,000
Great Southern Oil & Gas	37	dsl	1000	Ideco	636	10,000
Grey Wolf Drlg	3	dsl-elec	3000	EMSCO ECB	2000	25,000
Lama Drlg	1	dsl	600	Ideco H-4	350	9,000/4"
Woolf & Magee	4	dsl	850	Bethlehem S-45-E	475	9,500
CAMERON						
CRC Mallard Well	20	dsl	1300	Wilson 90	800	14,500
Delta Drlg	16	dsl	2300	National 130	2250	25,000
	65	dsl	2300	EMSCO C-1	2331	18,000
Glasscock Drlg	70	dsl	1600	National 80-B	1600	14,000
Goldrus Drlg	15	dsl	1740	Bethlehem M-810	1560	16,000
Inland Well Serv	6	dsl	800	Gar-Den 700	700	12,000
Power Rig Drlg	12	dsl	3200	EMSCO A-1500-M	2200	30,000
	16	dsl	2350	Brewster N-12-A	2800	20,000
	20	dsl	1350	EMSCO C-1	1350	18,000
	7	dsl	1850	EMSCO A-800	1800	12,500
Sanders Drlg	1	dsl	900	EMSCO A-800	1100	14,000
Welsh Drlg & Serv	15	dsl-elec	2700	M-CSCO 914-EU	3000	16,000
Woolf & Magee	6	dsl	850	Bethlehem S-45-E	475	9,500
CLAIBORNE						
Butler-Johnson	5	dsl	1800	Brewster N-95	1800	20,000
Lagerson Drlg	5	dsl-elec	1600	EMSCO J-750-E	1250	14,000
Murco Drlg	6	dsl	2200	Brewster N-95	1000	14,000
Sawyer Drlg & Serv	6	gas	1200	Brewster N-75	1200	13,000
Wheless Drlg	3	dsl	1800	EMSCO C-1-3	1800	18,000
CONCORDIA						
Energy Drlg	2	dsl	535	Ideco H-35-S	500	9,500
DE SOTO						
Gibson Drlg	3	dsl	820	Wilson Mogul 42	666	6,500

AUCTION...

...WHO NEEDS IT?
YOU... IF YOU ARE:

1. Considering Retirement
2. Discontinuing Business
3. Dissolving Partnership or Corporation
4. Liquidating Joint Venture
5. Settling an Estate
6. Completing Project
7. Liquidating Surplus Equipment
8. "Just Plain Fed-Up"

WHAT ARE THE ADVANTAGES?

1. Sell for CASH to YOU!
2. Sell when YOU are ready!
3. Bring the buyers to YOUR market!
4. YOUR price determined by competitive bidding!
5. YOUR complete sale is over in a matter of hours!

YOU decide the time, place, and terms of the Sale.

Successful businessmen are continually letting the Proven Pros at Nelson help solve their problems! What about you?

For confidential consultation in the privacy of your office or ours contact:

BILL ARCHER — 214/561-1150

AUCTIONEERS • LIQUIDATORS • APPRAISERS
NELSON INTERNATIONAL
DALLAS / TYLER / CALGARY

Circle 185 on Reader Service Card

RIG LOCATOR

For an additional copy of this Rig Locator, as a separately bound unit, check No: **175** on the Reader Service card.

Additional bulk copies of the Rig Locator may be purchased for **$2.00** each. Please send order and check to Service R&D Department,

PETROLEUM ENGINEER INTERNATIONAL, Box 1589, Dallas, Texas 75221.

LOUISIANA (Cont'd)

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
DE SOTO (Contd)						
H & S Drlg	1	dsl	1700	Brewster N-95	2145	14,000
	1	dsl	1700	Brewster N-95	2145	14,000
Sawyer Drlg & Serv	10	gas	1200	Whlnd 1000	1200	13,000
Schlensker Drlg	5	dsl	950	Unit U-15	950	10,000
United Drlg Co of Tyler	10	dsl	950	Unit U-34	470	8,000
EAST BATON ROUGE						
Cliffs Drlg	24	dsl	1300	National 1320	1300	25,000
Comet Drlg	14	dsl	2600	Gar-Den	3000	22,000
Goldrus Drlg	22	dsl	1250	Cabot/Franks 1000	872	13,500
	3	dsl-elec	1700	OILWELL E-2000	3400	20,000
Helmerich & Payne Intl Drlg	71	dsl	2600	National 1320-M	3300	20,000
Loffland Bros	115	dsl-elec	3200	M-CSCO U-1220-EBD	3000	28,000
	116	dsl-elec	3200	M-CSCO U-1220-EBD	3000	30,000
Merit Drlg	4	dsl-scr	2800	OILWELL 2000-E	2000	25,000
Penrod Drlg	122	dsl	1300	National 1625-M	2000	25,000
EAST FELICIANA						
Cliffs Drlg	31	dsl	1300	National 110	1300	20,000
Comet Drlg	6	dsl	1600	Ideco Super 7-11	1600	16,500
Glasscock Drlg	71	dsl	1100	National 110	1500	20,000
Power Rig Drlg	22	dsl-elec	2700	Ideco 3-1700	1700	18,000
EVANGELINE						
Parker Drlg	2	dsl	1200	OIME SL-1000-P	1200	14,000
Pernie Bailey Drlg	5	dsl	1500	National 55	1100	12,000
	8	dsl	2000	National 110-M	1500	20,000
FELICIANA						
Penrod Drlg	4	dsl	3425	EMSCO C-3	2200	30,000
FRANKLIN						
Underwood Oil Well Serv	12	dsl	350	Brewster N-3	350	4,000/3½"
GRANT						
Delta Drlg	97	dsl	2000	EMSCO J-1100	1560	16,000
IBERIA						
Delta Drlg	82	dsl-scr	3200	EMSCO C-11	3456	25,000
Glasscock Drlg	69	dsl	2700	National 1320	2700	20,000
Great Southern Oil & Gas	5	dsl	500	Wilson	318	7,000
Resource Drlg	RD-24	dsl	2330	National 110	2740	18,000
IBERVILLE						
American Well Serv & Drlg	11	dsl	1700	Brewster HI-4610A-38	575	8,000
Glasscock Drlg	72	dsl	800	National 80-B	1250	12,000
Goldrus Drlg	9	dsl	1750	Bethlehem M-810	1560	16,000
Grey Wolf Drlg	1	dsl	1170	EMSCO C-1	1170	16,000
MGF Drlg-Lafayette	42	dsl	1500	OILWELL 96	1500	16,000
Power Rig Drlg	15	dsl	2350	EMSCO 1013-B	2265	16,000
	17	dsl	2000	Ideco 7-11	2000	16,000
JACKSON						
Butler-Johnson	3	gas-btne	1200	EMSCO A-550	1200	13,500
Justiss Oil	11	dsl	1200	EMSCO GB-800	1600	14,000
Paramount Drlg	10	dsl	1350	National 75-CB	1350	14,000
Wheless Drlg	4	dsl	1800	EMSCO J-1100	1800	16,000
JEFFERSON						
Delta Drlg	25	dsl	2300	EMSCO C-1	2592	18,000
Grey Wolf Drlg	2	dsl-elec	3000	EMSCO C-11	2000	25,000
Inland Well Serv	14	dsl	2400	Brewster N-95	1600	18,000
JEFFERSON DAVIS						
Comet Drlg	12	dsl	1600	Cabot/Franks 1200	1200	13,500
	4	dsl	1250	Brewster N-75	750	12,000
Grey Wolf Drlg	8	dsl-elec	3000	EMSCO C-Z II	2000	25,000
MGF Drlg-Lafayette	47	dsl	1800	Ideco S-7-11	1500	17,000
Penrod Drlg	11	dsl	2600	National 1320-M	3425	25,000
Power Rig Drlg	18	dsl	3200	EMSCO C-2	2000	25,000
	8	dsl	2000	Ideco 7-11	2000	15,000
LA SALLE						
Justiss Oil	37	dsl	200	JF J-500	225	5,000
	39	dsl	300	JF J 6500	400	6,500
LAFAYETTE						
Explorer Drlg	10	dsl	1836	Bethlehem	1750	12,500
	14	dsl	1300	Cabot/Franks 2650	2000	13,500
	18	dsl	1300	Cabot/Franks 2650	2000	13,500
	20	dsl	800	Brewster TR-800	2000	10,000
	8	dsl	1836	Ideco H-1700	2000	15,000
	9	dsl	1300	EMSCO U-914-C	2730	20,000
Glasscock Drlg	62	dsl	2000	National 110	1700	16,000
	68	dsl	2700	National 1320	2700	20,000
Inland Well Serv	11	dsl	500	National 55	1100	10,000
Welsh Drlg & Serv	17	dsl	2600	National 110-M	2550	16,000
Wilson Bros Drlg	3	dsl	2600	National 1320	2700	30,000
LAFOURCHE						
Cliffs Drlg	18	dsl	1300	National 110	1300	20,000
Grey Wolf Drlg	7	dsl-elec	3000	EMSCO C-11	2000	25,000

LOUISIANA (Cont'd)

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
LINCOLN						
Butler-Johnson	10	dsl	1500	Gar-Den M-800	1500	14,000
Noble Drlg	N-812	dsl	1420	National 80-B	1420	15,000
Sawyer Drlg & Serv	5	dsl	1500	Brewster N-75	1500	13,000
Wilson Bros Drlg	10	dsl	2200	National 110	2100	20,000
LIVINGSTON						
Dual Drlg	22	dsl	3200	National 1320-M	2000	22,000 5"
	28	dsl	3400	OILWELL E-2000	2000	30,000
Eagle Prod & Drlg Serv	3	dsl-elec	2000	OILWELL E-2000	2000	25,000
Goldrus Drlg	2	dsl-elec	2000	OILWELL E-2000	2000	25,000
Parker Drlg	175	dsl	3000	OIME Hercules 3000-E	3000	30,000
Power Rig Drlg	14	dsl	2600	EMSCO A-1500	2000	25,000
Wilson Bros Drlg	8	dsl	1750	National 110	1750	16,000
MORGAN						
Inland Well Serv	7	dsl	800	Gar-Den	700	12,000
OUACHITA						
TR Drlg	3	dsl	300	Bethlehem S-45-A	200	3,500
PLAQUEMINES						
CRC Mallard Well	15	dsl	1300	Wilson 90	800	14,500
	17	dsl	1300	Wilson 90	800	14,500
MGF Drlg-Lafayette	41	dsl	1600	OILWELL 96	1600	15,000
POINTE COUPEE						
Cliffs Drlg	27	dsl	1300	National 1320		25,000
	30	dsl	1300	National 1320	1300	25,000
Dual Drlg	9	dsl	3200	National 1320-M	2000	25,000
Eljay Drlg	1	dsl-scr	2800	OILWELL E-2000	2000	25,000
	2	dsl-scr	2800	OILWELL E-2000	2000	25,000
MGF Drlg-Lafayette	401	dsl-elec	1600	National 320-UE	2000	25,000
Merit Drlg	1	dsl-scr	2800	OILWELL 2000-E	2000	25,000
Parker Drlg	165	dsl	3000	OIME Hercules 3000-E	3000	30,000
	174	dsl	3000	OIME Hercules 3000-E	3000	30,000
	180	dsl	3000	OIME Hercules 3000-E	3000	30,000
Penrod Drlg	1	dsl	3425	National 1625-M-6	2200	30,000
	10	dsl	2600	National 1320-M	3425	25,000
	110	dsl	1600	National 1625-M	2200	30,000
	27	dsl	2600	EMSCO C-2	2000	25,000
	28	dsl	3425	National 1320-M	2200	25,000
Resource Drlg	12	dsl	3105	National 1625	3740	30,000
	8	dsl	2330	National 110	2740	18,000
RAPIDES						
Rebel Drlg	3	dsl	500	Ideco H-30	400	9,000
RED RIVER						
Justiss Oil	9	dsl	800	EMSCO GC-500	1200	12,500
Sawyer Drlg & Serv	11	dsl	600	Wilson Giant	400	9,000
ST CHARLES						
American Well Serv & Drlg	14	dsl	1700	Brewster HI-4610-A	575	10,500
Wilson Bros Drlg	9	dsl	2600	National 110	2700	20,000
ST HELENA						
Penrod Drlg	24	dsl	2600	Brewster N-12-A	1950	25,000
ST JAMES						
Glasscock Drlg	64	dsl	2200	National 110	1700	16,000
ST LANDRY						
Amoy Drlg & Well Serv	55	dsl	1500	National 110	1500	16,000
Culver Drlg	10	dsl	1850	National 110	1650	16,000
Eljay Drlg	3	dsl-scr	3400	OILWELL E-3000	3000	30,000
Great Southern Oil & Gas	42	dsl	665	Ideco	636	10,000
Noble Drlg	OW-21	dsl-elec	3300	OILWELL E-2000	3300	25,000
Penrod Drlg	17	dsl	2600	National 1320-M	3425	25,000
	29	dsl	3425	National 1320-M	2200	25,000
Pernie Bailey Drlg	4	dsl	2900	National 1320-M	3000	20,000
Wilson Bros Drlg	6	dsl	2600	National 1320	2700	30,000
	7	dsl	1400	National 80-B	1400	12,500
ST MARTIN						
Comet Drlg	8	dsl	1600	Cabot/Franks 1200	1200	13,500
Delta Drlg	31	dsl	2300	EMSCO C-1	1560	20,000
Glasscock Drlg	61	dsl	1400	National 60-B	1250	13,500
ST MARY						
CRC Mallard Well	14	dsl	1300	Wilson 90	800	14,500
Goldrus Drlg	7	dsl	1750	Brewster N-95	1560	16,000
Grey Wolf Drlg	6	dsl-elec	3000	EMSCO C-II	2000	25,000
Penrod Drlg	117	dsl	1300	National 1625-M	2000	25,000
	8	dsl	2600	National 1320-M	3425	25,000
Pernie Bailey Drlg	6	dsl	3000	National 110-M	3000	18,000
	7	dsl	1200	Gar-Den 800	1200	11,000
Power Rig Drlg	23	dsl-elec	2000	EMSCO C-2	2000	30,000
	11	dsl	2700	EMSCO A-1500	2000	25,000
Wilson Bros Drlg	12	dsl	1850	National 110	1850	16,000
	2	dsl	1900	National 110	1900	20,000
ST TAMMANY						
Culver Drlg	11	dsl	2000	Gar-Den 1100	1650	16,000
TENSAS						
Eagle Drlg Co	1	dsl	318	1968 Gar-Den 3000	220	3,000

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
LOUISIANA (Cont'd)						
TENSAS (Contd)						
New & Hughes Drlg	5	dsl	450	Spencer 5000	500	7,000
	7	dsl	500	M-CSCO U-34	525	8,000
TERREBONNE						
CRC Mallard Well	12	dsl	800	Wilson Model 90	800	11,000
	16	dsl	1300	Wilson 90	800	14,000
	18	dsl	1300	Wilson 90	800	14,500
Delta Drlg	47	dsl	2300	National 130	2250	20,000
Glasscock Drlg	65	dsl	2200	National 110	1700	16,000
Goldrus Drlg	8	dsl-elec	1750	OILWELL 840-E	1700	18,000
Inland Well Serv	15	dsl	2400	Brewster N-95	1600	18,000
MGF Drlg-Lafayette	46	dsl	1800	Ideco S-7-11	1500	17,000
Murco Drlg	26	dsl	2800	OILWELL N-2000-B	3000	30,000
Resource Drlg	3	dsl	3105	National 1320	3740	25,000
Sanders Drlg	2	dsl	3200	Brewster N-12-A	3000	25,000
UNION						
Justiss Oil	10	dsl	500	Brewster N-45	600	10,000
Sawyer Drlg & Serv	7	gas	900	Ideco 750	900	12,500
Shuler Drlg	7	dsl		Spencer	600	6,000
VERMILION						
Delta Drlg	35	elec-scr	2550	EMSCO C-1	2592	20,000
	85	dsl-scr	2900	EMSCO C-11	3456	25,000
Glasscock Drlg	66	dsl	2700	National 1320	2700	20,000
Grey Wolf Drlg	4	dsl	1500	EMSCO GB-800	800	12,500
	5	dsl-elec	3000	EMSCO EDA	2000	25,000
Murco Drlg	46	dsl-scr	2800	OILWELL E-2000	2000	30,000
Noble Drlg	OW-31	dsl-elec	3135	OILWELL E-3000	3135	25,000
Penrod Drlg	18	dsl	2250	National 1625-M6	2200	10,000
Pernie Bailey Drlg	2	dsl	2000	80-B	1950	14,000
	3	dsl	2000	Brewster N-12		18,000
Power Rig Drlg	10	dsl	2600	EMSCO A-1500	1450	30,000
	21	dsl	3500	EMSCO C-2	2000	30,000
T-L Drlg	20	dsl	2700	Brewster N-95-A	2700	17,000
Wilson Bros Drlg	11	dsl	2400	National 110	2700	20,000
	16	dsl	2600	National 1320	2700	30,000
	4	dsl	2600	National 110	2700	20,000
WASHINGTON						
Chesley Pruet Drlg	15	dsl	4800	EMSCO C-3	4800	30,000
Tesoro Drlg	4	dsl	2600	National 1320-M	2742	25,000
	6	dsl	2600	National 1625-M	2742	30,000
WEBSTER						
Butler-Johnson	1	dsl	1900	Brewster N-85	1900	15,000
Nelson Drlg & Well Serv	1	dsl	600	Spencer 7000	500	9,000/4"
Noble Drlg	E-553	dsl	800	EMSCO A-550	800	12,000
WEST BATON ROUGE						
Eagle Prod & Drlg Serv	2	dsl-elec	2000	OILWELL E-2000	2000	25,000
Exeter Drlg Southern	32	dsl	2800	Gar-Den 1500	2800	25,000
Helmerich & Payne Intl Drlg	73	dsl-elec	3400	OILWELL 3000-M	3400	30,000
WEST FELICIANA						
Cliffs Drlg	32	dsl	1300	National 110	1300	20,000
Delta Drlg	76	dsl-scr	3200	Gar-Den 3000-RE	4600	30,000
Goldrus Drlg	5	dsl-elec	3400	OILWELL E-2000	1700	20,000
Helmerich & Payne Intl Drlg	41	dsl	1650	National 110	1650	22,000
Nicklos Drlg	25	dsl	2000	EMSCO A-1500	2119	20,000
Resource Drlg	11	dsl	3105	National 1625	3740	30,000
MARYLAND						
GARRETT						
Ray Resources	8	dsl	450	Brewster N-55	800	10,000
MICHIGAN						
UNDESIGNATED						
Cactus Drlg Ltd	22	dsl	1000	EMSCO GC-500	1000	12,500
	23	dsl	880	EMSCO GC-500	880	11,500
Nicor Drlg	21	dsl	800	Ideco H-35	510	7,000
	23	dsl	320	National T-12	290	4,500
BAY						
Bigard James Drlg	3	dsl	600	Cabot/Franks 550	550	7,500
CALHOUN						
Bigard James Drlg	7	dsl	600	Ideco H-37	535	7,500
CLARE						
Provins T D Drlg	3	dsl	600	Ideco 1000	1000	10,000
CRAWFORD						
Provins T D Drlg	4	dsl	600	Cooper 550	500	8,000
EATON						
Bigard James Drlg	16	dsl	475	Ideco H-44	600	8,500
	5	dsl	600	Wilson 65	535	7,000
GRAND TRAVERSE						
Cactus Drlg Corp	17	dsl	1000	Brewster N-55	800	11,000
Nicor Drlg	24	dsl	650	Ideco H-525	850	8,500
HILLSDALE						
Scott Don Drlg	5	dsl	550	Ideco H-1000	900	8,000
INGHAM						
L & G Drlg	2	dsl	500	Wilson 65	600	8,000
MICHIGAN (Cont'd)						
KALKASKA						
Cactus Drlg Corp	12	dsl	1000	OILWELL 66	800	10,000
	21	dsl	1000	Bethlehem M-58	800	12,000
Provins T D Drlg	2	dsl	600	Ideco H-37	456	8,000
	6		600	Ideco 700	700	9,000
LAPEER						
Bigard James Drlg	1	dsl	535	Ideco H-35	318	5,500
MANISTEE						
Bigard James Drlg	10	dsl	700	Ideco H-44	600	8,500
	8	dsl	600	Ideco H-44	600	8,500
Cactus Drlg Corp	28	dsl	1070	National 50-A	800	10,000
Nicor Drlg	22	dsl	1200	Ideco H-35	720	7,000
MASON						
Provins T D Drlg	1	dsl	500	Cooper 5656	350	4,000
MECOSTA						
Michigan Consolidated Gas	2	dsl	350	Walker-Neer C-25-A	350	4,500
	4	dsl	500	Ideco DI-7015	600	7,500
MISSAUKEE						
Bigard James Drlg	11	dsl-elec	1000	Ideco ED-1200	2000	20,000
	12	dsl-elec	1000	Ideco ED-1200	2000	20,000
	14	dsl	600	Ideco H-1000	1000	12,000
	15	dsl	600	Ideco H-1000	1000	12,000
	9	dsl	600	Ideco H-44	600	8,500
L & G Drlg	3	dsl	500	EMSCO GB-350	600	10,000
OSCEOLA						
Provins T D Drlg	7	dsl	600	Ideco H-1000	1000	12,000
	8	dsl	600	Ideco H-1000	1000	12,000
	9	dsl	900	Cabot/Franks 1500	1500	20,000
OSCODA						
Provins T D Drlg	5	dsl	600	Ideco 1000	1000	10,000
OTSEGO						
Cactus Drlg Corp	16	dsl	1070	National 50-A	850	10,000
ROSCOMMON						
L & G Drlg	1	dsl	398	Ideco H-35	398	5,000
MINNESOTA						
TWIG						
Exeter Drlg Northern	2	dsl	375	EMSCO GA-250	460	7,500
MISSISSIPPI						
ADAMS						
D & D Drlg	1	dsl	325	Brewster N-4-A	350	8,000
Energy Drlg	H-35-S	dsl	400	Ideco H-35-S	540	9,000
	1	dsl	400	Bethlehem S-45-A	350	7,000
New & Hughes Drlg	9	dsl	450	Spencer 5000	550	7,000
Rebel Drlg	1	dsl	300	Brewster N-4	300	6,500
	2	dsl	350	Bethlehem S-455	350	8,000
Wilcox Drillers	4	dsl	350	Ideco H-30	350	7,500/3½"
CLARKE						
Murco Drlg	10	dsl	2200	Brewster N-95	2400	20,000
Rapad Drlg	2	dsl	1800	EMSCO GB-500	1200	13,500
CLAY						
Crescent Drlg	7	dsl	1200	Bethlehem Toro	1200	12,000
Penrod Drlg	7	dsl	3425	National 1625-M-6	2200	30,000
FRANKLIN						
D & D Drlg Co	3	dsl	450	Brewster N-45	350	8,000
New & Hughes Drlg	14	dsl	1500	EMSCO C-2	2000	22,000
Par-Co Drlg	1	dsl	300	Ideco H-30	300	6,000
HANCOCK						
Chesley Pruet Drlg	16	dsl	3600	EMSCO C-2	3600	30,000
Lama Drlg	8	dsl	1300	National 100	1300	14,000
	112	dsl	1600	National 1625-M	3000	30,000
HINDS						
Helmerich & Payne Intl Drlg	87	dsl-elec	1600	National 1625-M	4850	20,000
JACKSON						
Tesoro Drlg	2	dsl	2300	National 1320-M	2742	20,000
JASPER						
Justiss Oil	24	dsl	3600	EMSCO J-1400	3000	22,000
Penrod Drlg	109	dsl	2000	Brewster N-75-A	1760	15,000
JEFFERSON						
Dual Drlg	7	dsl	2800	National 1320-M	2000	25,000
JEFFERSON DAVIS						
Chesley Pruet Drlg	14	dsl	3600	Gar-Den 1500	3600	25,000
Exeter Drlg Southern	15	dsl	2550	Gar-Den 1100	1550	18,000
Helmerich & Payne Intl Drlg	40	dsl	1545	OILWELL 860	1545	20,000
	45	dsl-elec	3000	National 1320-UE	3000	26,000
	79	scr	2200	National 110	1500	20,000
Loffland Bros	114	dsl-elec	3300	M-CSCO U-1220-EBD	3300	30,000
JONES						
Murco Drlg	18	dsl	2800	M-CSCO U-1220	2400	25,000
Rapad Drlg	4	dsl-elec	2000	EMSCO C-1	4000	25,000

MISSISSIPPI (Cont'd)

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
LAMAR						
Marion Drlg	2	dsl	2400	EMSCO C-1	2400	20,000
LAWRENCE						
Goldrus Drlg	1	dsl-elec	2000	OILWELL E-3000	3000	30,000
LINCOLN						
Marion Drlg	4	dsl	2400	EMSCO Model C-2	2400	25,000
	5	dsl	2400	OILWELL M-2000	2400	25,000
Penrod Drlg	106	dsl	1575	National 80-B	1760	15,000
MADISON						
Helmerich & Payne Intl Drlg	72	dsl	3270	OILWELL 3000-M	3270	30,000
MARION						
Chesley Pruet Drlg	12	dsl	3600	EMSCO C-2	3600	25,000
Exeter Drlg Southern	16	dsl	2600	Gar-Den 1500	2600	25,000
	27	dsl	2800	Gar-Den 1500	2800	25,000
Helmerich & Payne Intl Drlg	75	dsl	3200	National 1625-M	3740	15,500
Lohmann-Johnson Drlg	9	dsl	300	National T-12	300	3,500
Murco Drlg	22	dsl	2400	Brewster N-95	2400	20,000
Rapad Drlg	3	dsl-elec	4000	Gar-Den 1500-E	2000	25,000
Tesoro Drlg	3	dsl	2600	National 1320-M	2742	25,000
MONROE						
Resource Drlg	10	dsl	2330	National 110	2740	18,000
Warrior Drlg & Engr	2	dsl	360	Unit 15	300	4,000
PERRY						
Marion Drlg	1	dsl	1800	EMSCO Model M-810	1800	17,000
PIKE						
Helmerich & Payne Intl Drlg	77	dsl	2100	National 110	2000	17,000
Lama Drlg	9	dsl	1000	Wilson Titan	1000	12,000/4"
RANKIN						
Loffland Bros	330	dsl	2400	M-CSCO U-1220	2775	22,000
Penrod Drlg	21	dsl	2600	National 1320-M	1950	15,000
ROOSEVELT						
Bomac Drlg	37	dsl	750	National 50-A	750	10,500
SCOTT						
New & Hughes Drlg	8	dsl	1200	National 80-B	1200	15,000
SIMPSON						
Helmerich & Payne Intl Drlg	86	dsl-elec		National 1625-DE	3850	30,000
Penrod Drlg	6	dsl	3425	National 1625-M-6	2200	30,000
SMITH						
Helmerich & Payne Intl Drlg	74	dsl	3400	OILWELL	3740	30,000
Lama Drlg	5	dsl	1000	National 75	1000	13,500/4"
	7	dsl	1740	National 100	1740	15,500
Resource Drlg	6	dsl	2330	National 110	2740	18,000
Tesoro Drlg	5		2000	National 80-B	1650	15,000
STONE						
Penrod Drlg	5	dsl-elec	3425	EMSCO C-3	3200	30,000
WALTHALL						
Marion Drlg	6	dsl	3300	EMSCO Model C-3	3300	30,000
WARREN						
Justiss Oil	16	dsl	600	EMSCO GB	900	12,000
	7	dsl	1800	EMSCO J-1400	2900	20,000
Penrod Drlg	12	dsl	3850	Gar-Den 1500	2120	20,000
WAYNE						
Justiss Oil	23	dsl	1800	EMSCO J-1100	2400	20,000
Loffland Bros	328	dsl	2160	National 130	2400	22,500
WILKINSON						
Penrod Drlg	120	dsl	1600	National 1625-M	3000	30,000
YAZOO						
Delta Drlg	96	dsl-elec	2600	EMSCO C-1	3456	20,000

MONTANA

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
UNDESIGNATED						
Bird Drlg	2	dsl	350	EMSCO 250	500	7,500
	5	dsl	350	National 370	800	9,000
Cardinal Drlg	3	dsl	400	EMSCO SOS 6000-S	400	6,500/3½"
Comanche Drlg Co	4	dsl	270	Mayhew 2500-A	220	2,500
Hi Tower Drlg	23	dsl	1100	National 50-A	810	9,000
	6	dsl	1020	OILWELL 76	1020	12,000
BAKER						
GCO Drlg	3	dsl	820	M-CSCO U-15	650	10,000
	4	dsl	1300	National 50-A	850	11,500
BLAINE						
KB Drlg	1	dsl	278	Cardwell A-150-A Double Drum	185	4,500
	2	dsl	278	Cardwell AH-91 Single Drum	185	5,000/3½"

MONTANA (Cont'd)

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
BROADWATER						
Molen Drlg	4	dsl	1350	Brewster N-75-A	1350	14,000
CARBON						
Anderson-Myers Drlg	15	dsl	1800	Brewster N-75-A	1500	14,000
Molen Drlg	1	dsl	350	EMSCO GB-250-T	350	5,500
DANIELS						
Anderson-Myers Drlg	5	dsl	1000	EMSCO GB-500	820	10,000
Helmerich & Payne Intl Drlg	53	dsl-elec	1150	Ideco H-525	1300	10,900
DAWSON						
Nicor Drlg	40	dsl	800	OILWELL 600	600	11,000
	41	dsl	1000	Gar-Den 1100-M	1500	18,000
GARFIELD						
Brinkerhoff-Signal	82	dsl	1500	Gar-Den 700-M	1500	14,000
GLACIER						
Comanche Drlg Co	5	dsl	430	Ideco H-30	400	5,000
General Well Serv	6	dsl	450	Cardwell KB-210-A	400	5,000/3½"
Molen Drlg	2	dsl	800	Brewster N-46	800	10,000
GRANITE						
Enopco	1	dsl	2430	National 110-M	2430	20,000
HILL						
Elenburg Expl	2	dsl	420	Walker-Neer CC-2000	180	2,500
LIBERTY						
Comanche Drlg Co	2	dsl	430	Ideco H-30	400	5,000
Elenburg Expl	10	dsl	350	Lee Engineer	350	5,000
MC CONE						
Bomac Drlg	25	dsl	1650	Bethlehem 810		
	57	dsl	2000	Gar-Den 800	1800	16,000
Tierra Drlg	12	dsl-elec	750	BDW 800-MX	1000	14,000
MUSSELSHELL						
True Drlg	4	dsl	350	EMSCO GA-250-T	500	6,500
PARK						
Bomac Drlg	43	dsl	930	EMSCO GB-500	930	10,500
PETROLEUM						
Molen Drlg	3	dsl	700	National 50-A	700	9,000
PHILLIPS						
Elenburg Expl	8	dsl	420	Walker-Neer CC-2000	230	2,500
PONDERA						
Aikins Drlg	2	dsl	200	Bycyrus	200	3,000/2⅞"
Aspen Drlg	1	dsl	400	Ewbanks 3500	475	3,500
RICHLAND						
Atco Drlg	10	dsl-elec	2000	National 80-UE	1000	15,000
Blocker Drlg Canada	10	dsl	1000	OIME 5-D3	770	10,000
Bomac Drlg	36	dsl	1435	National 80	1435	14,000
	51	dsl	2600	National 110	2400	20,000
Brinkerhoff-Signal	21	dsl	1040	EMSCO GC-500	1040	11,500
	74	dsl	1500	Gar-Den GD-800	1500	15,000
Brown Tom	22	dsl	700	National 50-CA	700	11,000
	28	dsl	1650	Gar-Den 800	1650	16,000
Dixilyn-Field Drlg	35	dsl	1600	National 80-UE	1800	15,000
Drilcon	1	dsl	1125	Bethlehem 450	1125	11,000
	4	dsl	1860	National 110	1860	15,000
	5	dsl	1200	Ideco H-725	1000	11,500
Helmerich & Payne Intl Drlg	15	dsl	1300	OILWELL 76	1365	12,500
Kenai Drlg Rocky Mountain	27	dsl	1600	National CA-75	1200	14,000
Montgomery Drlg	45	dsl	2000	EMSCO GB-800	750	12,000/5"
Nicor Drlg	17	dsl	1100	OILWELL 76	1000	15,000
Noble Drlg	E-552	dsl	800	EMSCO A-550	800	13,000
	N-810	dsl	1606	National 80-B	1606	15,000
Parker Drlg	92	dsl	1200	National 100-M	1200	15,000
Pruet-Ram-Co	5	dsl	1800	EMSCO D-2	1200	14,000
Star Drlg	82	dsl	1000	Gar-Den GD-700	1350	12,500
Transcontinental Drlg	46	dsl	2000	National 80-B	1836	15,000
ROOSEVELT						
Atco Drlg	58	dsl-elec	1800	National 80-UE	1800	15,000
Bomac Drlg	50	dsl	1800	National 80-B	2000	16,000
Dual Drlg	27	dsl	1900	EMSCO D-3	1000	16,000
General Well Serv	21	dsl	450	Cooper LTD-550	400	6,000/3½"
Kenai Drlg Rocky Mountain	26	dsl	1200	Wilson Atlas	1200	14,000
Kenting Drlg	30-E	dsl-elec	2000	National 80-UE	1000	12,000
Star Drlg	81	dsl	1000	Gar-Den GD-800	1350	15,000
True Drlg	22	dsl	1200	National 55	1200	13,000
ROSEBUD						
Soape Drlg	1	dsl	950	National 45	950	7,500
SHERIDAN						
Bomac Drlg	39	dsl	1300	Brewster N-75	1155	12,000
Cardinal Drlg	14	dsl	375	EMSCO GB-350	375	8,500
Enopco	2	dsl	1890	National 610	1080	13,000
Nicor Drlg	16	dsl	1550	OILWELL 76	1000	15,000
Noble Drlg	N-89	dsl	800	National 80-B	800	13,000
Penrod Drlg	101	dsl	1684	Brewster N-46	1080	10,000
Pruet-Ram-Co	3	dsl	1800	EMSCO D-2	1200	15,000

MONTANA (Cont'd)

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
SHERIDAN (Contd)						
Pruet-Ram-Co	4	dsl	2000	EMSCO D-3	2000	18,000
Ratliff Drlg	6	dsl	1650	EMSCO GB-800	1650	17,000
Westburne Drlg	61	dsl	1000	National 55	1320	12,500
SIDNEY						
Arrowhead Drlg	C-1	dsl	1040	National 610	1040	12,000
TETON						
Simmons Drlg	37	dsl	660	National 370	660	8,500
TOOLE						
Aspen Drlg	2	dsl	500	Challenger M-280-DD	500	4,500
Comanche Drlg Co	1	dsl	430	Ideco H-30	400	5,000
Elenburg Expl	5	dsl	420	Walker-Neer CC-2000	180	2,500
WIBAUX						
Drilcon	3	dsl	1176	National 50-A	784	10,000
Enopco	3	dsl	1620	National 80-B	1620	17,500
Kenai Drlg Rocky Mountain	33	dsl	1350	Wilson Giant	1000	12,000
WILLISTON						
Sharp Drlg	369	dsl-elec	2000	Unit U-712-EC	1545	18,000
YELLOWSTONE						
L & R Drlg	2	dsl	250	Mayhew 2000	165	2,000/3½"
Molen Drlg	5	dsl	400	Brewster N-46	800	10,000

NEBRASKA

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
BANNER						
Exeter Drlg Northern	4	dsl	375	National T-32	460	8,000
CHEYENNE						
Exeter Drlg Northern	42	dsl	375	National T-32	460	7,500
Gear Drlg	2	dsl	300	National T-32	325	6,000
DUNDY						
Murfin Drlg	20	dsl	525	National 370	600	7,500
HITCHCOCK						
Murfin Drlg	2	dsl	400	National T-32	400	5,000
	23	dsl	375	Ideco 35	475	6,500
Stoeppelwerth Drlg	1	dsl	375	National T-32	375	5,500
	2	dsl	350	Cardwell 500-L	325	4,500
KIMBALL						
Banner Drlg	3	dsl	500	National T-45	800	9,500
Gear Drlg	1	dsl	350	National 50-A	550	7,500
RED WILLOW						
Murfin Drlg	3	dsl	400	National T-25	400	5,000
Moxe Drlg	1	dsl	540	Ideco 35	380	7,000

NEVADA

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
CHURCHILL						
Brinkerhoff-Signal	2	dsl	875	M-CSCO U-36-A	600	9,000
Kenai Drlg West Coast	6	dsl	875	EMSCO J-750	800	11,500
Montgomery Drlg	2	dsl-elec	2000	OILWELL 940-E	3000	18,000/5"
NYE						
Cardinal Drlg	2	dsl	864	EMSCO 3	760	8,000
Montgomery Drlg	5	dsl-elec	2700	National 1320-UE	3645	25,000/5"

NEW MEXICO

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
UNDESIGNATED						
Arapahoe Drlg	4	gas-btne	700	National 50-A	500	12,000
WEK Drlg	1	dsl	500	M-CSCO U-34	360	7,500
	2	dsl	600	Ideco H-35	440	10,500
	3	dsl	450	EMSCO S-45-E	220	6,500
BERNALILLO						
Brinkerhoff-Signal	15	dsl	2000	Gar-Den 1500	2000	20,000
Earl & Son Drlg	1	top drive	1500	Ingersoll	3800	1,500
CHAVES						
Artesia Fishing Tool	1	dsl	400	Mayhew 3000	200	4,000
Brown Tom	30	dsl	350	Unit U-15	500	8,500
Dual Drlg	6	dsl	600	EMSCO GB-350	560	7,500
Kenai Drlg of Texas	15	dsl	600	EMSCO G-500	800	11,000/4"
	15	dsl	580	EMSCO GC-500	800	11,000
L & M Drlg	1	dsl	750	G42	440	7,500
Moranco	5	dsl	750	M-CSCO U-15	750	11,000
DONA ANA						
Montgomery Drlg	7	dsl	1200	National 75	700	11,000/5"
EDDY						
Ard Drlg	3	dsl	1400	M-CSCO U-40	1200	15,000
	5	dsl	1986	M-CSCO U-20	1800	15,000
	6	dsl	1200	M-CSCO U-15	1200	11,500
	8	dsl	1900	EMSCO 800-GB	1800	16,000
Brown Tom	12	gas	700	National 50	700	10,500
Cactus Drlg Corp	8	dsl	850	Brewster N-7	1170	10,000
Hondo Drlg	1	dsl	950	M-CSCO U-15	700	10,500
	10	dsl	1250	Brewster N-75-A	1250	15,000
	6	gas	600	M-CSCO U-15	500	9,000
Kenai Drlg of New Mexico	2	dsl	2000	EMSCO J-1250	2000	15,000

NEW MEXICO (Cont'd)

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
EDDY (Contd)						
Kenai Drlg of New Mexico	23	dsl	2000	EMSCO JB-1250	1400	15,000
Kenai Drlg of Texas	14	dsl	700	EMSCO GC-500	800	11,500
L & M Drlg	2	dsl	750	Gar-Den 3000	380	6,000/3½"
Landis Drlg	3	dsl	800	Brewster N-55	900	11,500
	4	dsl	800	Brewster N-45	700	10,000
MGF Drlg-Midland	23	dsl	1150	OILWELL 76	1150	13,500
McVay Drlg	4	dsl	850	National 75	850	12,000
	7	dsl	1200	National 75-CA	1200	13,000
	8	gas	1200	National 80-B	1200	15,000
Moranco	3	dsl	1100	M-CSCO 712-A	1000	15,000
	7	dsl	1100	Brewster N-75	1000	15,000
Parker Drlg	34	gas	1200	National 75	1200	16,000
	38	gas	1200	National 100-M	1800	18,000
Quarles Drlg	1	dsl	1800	OIME 750	750	14,500
Sharp Drlg	32	dsl	1500	EMSCO 800	1482	16,500
	63	dsl	2000	EMSCO D-3	1836	18,000
Warton Drlg	1	gas	1650	Brewster N-75	1650	13,000
	3	dsl	3300	National 110	3300	18,000
	4	gas	1300	National 100	1650	16,000
	5	dsl	1270	National 50-A	1370	11,000
	6	gas	1700	National 80-B	1320	16,000
	8		900	Cabot/Franks M-750	635	7,000
Willbaos Drlg	6	dsl	800	EMSCO G-500	800	12,000
GRANT						
Morrow Drlg	2	dsl	680	Morrow 350	350	4,000
HARDING						
Cactus Drlg (NM)	65	dsl	502	Brewster N-4	454	6,000
	66	dsl	502	Brewster N-4	454	6,000
	65	dsl	520	Brewster N-4	454	6,000
	66	dsl	520	Brewster N-4	454	6,000
Calvert Western Expl	5	dsl	950	Cabot Explorer	400	5,000
HOBBS						
Cactus Drlg (TX)	69	dsl	820	National 370	718	9,000
LEA						
Ard Drlg	2	dsl	1986	M-CSCO U-20	1800	18,000
BBL Drlg	2	dsl	500	Wilson Mogul 42	760	6,500
Cactus Drlg (NM)	18	dsl	550	National T-32		8,000
	64	dsl	875	Brewster N-45	670	7,500
	67	dsl	502	National T-32	454	6,500
	68	dsl	375	Ideco H-30	454	6,000
	64	dsl	520	Brewster N-45	670	7,500
	67	dsl	520	National T-32	454	6,500
	68	dsl	520	Ideco H-30	454	6,000
	10	dsl	800	Bethlehem M-58	984	11,000
	30	dsl	2000	National 110	2976	23,000
Delta Drlg	3	dsl	2300	EMSCO C-1	2331	18,000
	60	dsl-elec	1825	EMEO D-3	2592	15,000
Hondo Drlg	3	dsl	1200	Bethlehem M-58-C	800	13,500
	4	dsl	1450	Brewster N-75	1150	13,500
	5	dsl	1200	National 55-C	800	13,500
Kenai Drlg of New Mexico	21	dsl	1700	Unit U-20	1400	15,000
	22	dsl	1700	EMSCO J-1100	1400	15,000
Kenai Drlg of Texas	18	dsl	410	Ideco H-35	450	6,500/4"
	18	dsl	800	Ideco H-35	580	7,000
Landis Drlg	2	dsl	1000	Brewster N-75	1350	14,000
Loffland Bros	112	dsl-elec	3300	M-CSCO U-1220-EB	2200	30,000
MGF Drlg-Midland	1	dsl	750	Bethlehem M-58	750	12,500
	22	dsl	1500	OILWELL 760	1500	15,000
	25	dsl	1725	Brewster N-95	1725	19,500
	26	dsl	1725	Gar-Den 1100	1725	19,000
McVay Drlg	10	dsl	1300	National 100	1300	16,000
	9	dsl	1400	National 110	1400	18,000
Moranco	1	dsl	1100	OIME 1000-SL	1000	15,000
	2	dsl	1100	EMSCO GB-800	1000	15,000
	6	dsl	750	Brewster N-75	750	12,000
Parker Drlg	16	gas	1200	OILWELL 76	1200	16,000
	161	gas	1200	National 75	1200	16,000
	211	gas	2000	National 75	2000	22,000
	58	dsl	1650	National 100-M	1650	20,000
	85	gas	2000	National 130	2000	23,000
	89	gas	2000	National 1320	2000	23,000
Resource Drlg	RD-25	dsl	1560	National 80-B	1835	14,000
Santa Fe Drlg Western	12	dsl-elec	2000	EMSCO A-1100-E	1800	19,000
Sharp Drlg	36	dsl	2940	Bethlehem MC-950	2742	22,000
	48	dsl	1355	Bethlehem M-58	988	13,500
	62	dsl	1600	EMSCO D-3	1414	16,000
Tri-Service Drlg	8	gas-btne	750	OILWELL 76	750	13,000
Warton Drlg	2	dsl	970	National 50-A	1100	11,000
	7	dsl	1200	National 75	1300	13,000
Willbaos Drlg	1	dsl	1200	OILWELL 76	1200	14,000
	5	gas	1100	Bethlehem 450	1100	13,000
	7	gas	1275	EMSCO A-800	1275	16,000
QUAY						
Aztec Well Serv	50	dsl	400	Wilson Mogul	350	6,000
	56	dsl	400	Wilson Mogul	350	6,000
RIO ARRIBA						
Arapahoe Drlg	3	gas-btne	300	Wilson Mogul	320	6,500
Aztec Well Serv	222		750	Wilson M-75	1100	
	73	dsl	400	Cardwell KM-210	500	6,500
Bayless Drlg	5	dsl	1500	Cooper LTO-550	550	8,500

NEW MEXICO (Cont'd)

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
RIO ARRIBA (Cont'd)						
Four Corners Drlg	10	dsl	750	Cardwell Drlg	700	8,000
	6	dsl	750	Cardwell KB-500	636	8,000
	8	dsl	750	Cardwell KB-500	636	8,000
Mesa Drillers	1	dsl	600	National 50-A	750	8,000
Young Drlg	5	dsl	750	Cardwell K-500	600	8,000
ROOSEVELT						
Cherokee Drlg & Dev	3	dsl	1150	Wilson 75	900	11,000
Republic Drlg & Serv	4	dsl-elec	1200	OILWELL 760-E	1000	14,000
	7	dsl	1000	Ideco 525	700	10,000
	8	dsl	1000	Ideco 525	800	10,000
SAN JUAN						
Aztec Well Serv	124	dsl	600	Wilson 75	1100	10,000
	171	dsl	600	Wilson M-75	700	
	75	dsl	360	Cardwell KM-210	400	4,500
Bayless Drlg	2	dsl	350	Challenger M-280	400	8,500
Brinkerhoff-Signal	79	dsl	550	National 370	800	8,500
Cactus Drlg Corp	19	gas-dsl	1070	National 50-A	984	10,000
Challenger Drlg	14-5	dsl	5500*	National 125	1100	4,000
Coleman Drlg	1	dsl	800	Wilson Mogul	750	8,000
Four Corners Drlg	2	dsl	750	Cardwell KB-500	700	8,000
	4	dsl	750	Cardwell KB-500	700	8,000
	5	dsl	750	Cardwell KB-500	700	6,000
	7	dsl	750	Cardwell KB-500	636	8,000
	9	dsl	750	Cardwell KB-500	700	8,000
Kenai Drlg of New Mexico	10	dsl	800	EMSCO GA-250-T	400	6,500
	31	dsl	900	Wilson MAC 300	400	6,500
Lama Drlg	4	dsl	500	M-CSCO U-34	300	9,000
LLL Drlg	2	dsl	1720	Cavot/Franks 750	1720	13,800/3½"
Young Drlg	2	dsl	600	Ideco DIR-701	600	8,500
	3	dsl	400	Wilson 75	600	8,500
SANDOVAL						
Aztec Well Serv	184	dsl	600	Wilson M-75	1100	
Brinkerhoff-Signal	56	dsl-elec		EMSCO A-110-E		18,000
	78	dsl	1600	National 610	1100	12,500
SANTA FE						
Loffland Bros	5	dsl	1220	Ideco H-1000	868	12,000
UNION						
Baker & Taylor Drlg	18	dsl	470	EMSCO 250	470	4,500
Moran Bros	52	dsl	350	Wilson Super 38	350	4,000
	56	dsl	600	Wilson Super 38	350	4,000

NEW YORK

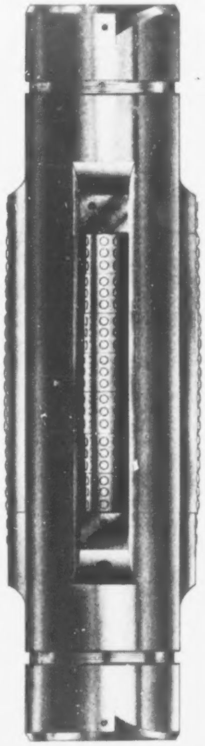
Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
UNDESIGNATED						
Underwater Gas Dev	1	dsl	250	Failing 2500	200	40,000
	2	dsl	200	Ingersoll T-5	350	40,000
	4	dsl	320	Challenger 320	320	5,000
	5	dsl	250	Failing 3500	250	40,000
Westburne Drlg Canada	11	dsl	1725	OILWELL 96	1725	20,000
	18	dsl	1680	Unit U-914-C	1680	18,000
	20	dsl	1950	M-CSCO U-1220-D	1950	20,000
	23	dsl	1050	National 50-A	700	8,500
	5	dsl	1950	National 1320-M	1950	20,000
	9	dsl	520	National T-45	460	8,500
CHAUTAUQUA						
Delta Drlg	91	dsl	255	Ideco H-35-KD	291	6,500
International Petr Serv	3	dsl	350	CP-T-750-DH	285	4,500
	6	dsl	475	Wilson 42	475	7,500
	7	dsl	475	Challenger Model 320	360	4,000
STEUBEN						
Delta Drlg	72	dsl	250	Spencer 7000	440	9,000
WYOMING						
International Petr Serv	2	dsl	275	CP-7000	375	4,000

NORTH DAKOTA

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
UNDESIGNATED						
Bird Drlg	3	dsl	500	EMSCO 500	800	10,500
	4	dsl	350	EMSCO GB-350	700	8,500
	7	dsl	500	U-36-A	800	10,500
Blocker Drlg Canada	1	dsl	2000	OIME 1500-SL	1500	18,000
Farwest	3	dsl-el-scr	2000	Ideco 1200-E	1800	15,000
	4	dsl-el-scr	2000	Ideco 1200	1300	15,000
BILLINGS						
Anderson-Myers Drlg	6	dsl	1650	EMSCO GB-800	1800	15,000
	8	dsl	2000	National 80	1800	16,000
Bomac Drlg	33	dsl	2000	OILWELL 96	1500	16,000
	38	dsl	900	Gar-Den 700-M	900	11,500
	40	dsl	1000	OILWELL 76	1000	12,000
	41	dsl	1000	Brewster N-7	1000	10,500
	45	dsl	2000	Gar-Den GD-800	1800	16,000
	49	dsl	2000	Gar-Den 800	1800	16,000
Brinkerhoff-Signal	5	dsl	1500	National 80	1500	15,000
Cardinal Drlg	1	dsl	864	EMSCO 500	864	10,500
	10	dsl	1296	EMSCO GB-800	1296	13,500
	7	dsl	864	EMSCO 500	864	10,000
	9	dsl	880	National 50-CA	880	11,500
Comanche Drlg Ltd	3	dsl	500	OILWELL 66	800	10,000
Nicor Drlg	62	dsl	1000	National 610	750	12,500

THE EMTEC CONNECTION IS *No* CONNECTION

New EMTEC SAFE-STRING™ VERTICAL ROLLING CUTTER REAMER AND RUBBER SLEEVE CENTRALIZER


Vertical Rolling Cutter Reamer

Utilizing the Emtec Clamp-On Concept with no pin and box connections.

The new Emtec vertical rolling cutter reamer and non-rotating rubber sleeve centralizer are designed to clamp "on-the-string" with the patented Emtec Connection. There are **no pin and box connections** to twist off or wash out. Both tools can be connected at any point along the drill string to give you maximum versatility in meeting your particular drilling needs. And these tools can be connected in combination with any other Emtec Clamp-On tools and still give you full drill string strength. When you use the Emtec connection you stay connected.

Safe-String™ Vertical Rolling Cutter Reamer and Rubber Sleeve Centralizer from Emtec . . . Your Best Connection in the Oil Patch.

Emtec Safe-String™ and Sure-Grip™ tools are covered by U.S. letters of patent #4,101,179

EMTEC
Always Looking for a Better Way

Rubber Sleeve Centralizer

1st International Plaza Suite 4550 Houston, Texas 77002 Tel: (713) 759-0091 Telex: 79-1012 'Finlay Hou'

Circle 307 on Reader Service Card

NORTH DAKOTA (Cont'd)

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
BILLINGS (Contd)						
Penrod Drlg	103	dsl	1760	National 80-B	2000	20,000
Ratliff Drlg	15	dsl	1650	National 80-B	1650	18,000
Republic Drlg & Serv	2	dsl-elec	1200	OILWELL 740-E	1000	14,000
Transcontinental Drlg	51	dsl	1070	OILWELL 76	1224	12,500
Westburne Drlg	53	dsl	750	National Ideal 55	950	12,000
	59	dsl	1100	Ideco M-750-D	800	10,000
	62	dsl	1050	National 50-A	1200	11,000
	63	dsl	1000	OIME SL-7	1400	15,000
BOTTINEAU						
Cardinal Drlg	8	dsl	560	National T-20	400	5,000/4"
BURKE						
Bomac Drlg	31	dsl	700	Bethlehem S-45-E	700	[illegible]00
DIVIDE						
Kenting Drlg	2	dsl	1200	M-CSCO U-40	1200	14,000
Nobel Drlg	N-84	dsl	1320	National 80-B	1320	15,000
DUNN						
Blocker Drlg Canada	2	dsl	2000	OIME 1000-SL	1500	16,000
	3	dsl	1500	OIME 750-SL	1155	14,000
Bomac Drlg	35	dsl	2000	National 110	2300	20,000
	52	dsl	2000	National 80-B	1800	16,000
Brinkerhoff-Signal	10	dsl	1000	M-CSCO U-40	1000	13,000
	17	dsl	1560	National 80-B	1560	14,000
Burris Drlg	101	dsl	1000	Gar-Den 1100-M	1500	20,000
Nicor Drlg	25	dsl	1600	National 125	1200	15,000
	26	dsl	1200	National 50-A	425	11,500
	59	dsl	1400	National 55-M	700	14,500
Noble Drlg	E-551	dsl	800	EMSCO A-550	800	13,000
Pruet-Ram-Co	1	dsl-elec	2000	EMSCO D-3	2000	18,000
Republic Drlg & Serv	1	dsl-elec	1200	OILWELL 740-E	1000	14,000
Westburne Drlg	64	dsl	1680	Unit 914-C	1680	18,000
GOLDEN						
Blocker Drlg Canada	8	dsl	1600	OIME 750-SL	1155	14,000
MC KENZIE						
Amoy Drlg & Well Serv	52	dsl	1500	National 1500	1500	16,000
Atco Drlg	54	dsl-elec	1800	National 610-UE	1800	12,000
Blocker Drlg Canada	4	dsl	1500	OIME 750-SL	1155	14,000
Bomac Drlg	30	dsl	1700	OILWELL 96	1500	16,000
	42	dsl	930	National 50-A	930	10,500
	47	dsl	2000	National 80-B	1800	16,000
	48	dsl	2000	Gar-Den 800	1800	16,000
	54	dsl	1300	National 610	1200	11,500
	55	dsl	2000	Gar-Den 800	1800	16,000
Brinkerhoff-Signal	1	dsl	1100	Gar-Den 800	1100	13,000
	11	dsl	1500	National 80-B	1500	15,000
	77	dsl	1500	Gar-Den 800-M	1500	13,500
	80	dsl	1500	National 80-B	1500	16,000
	81	dsl-elec	2100	OILWELL 760-E	2100	16,000
Brown Tom	16	dsl	700	National 50-CA	700	10,500
	19	dsl	700	National CA-50	700	10,000
Burris Drlg	102	dsl	750	Gar-Den 700	800	13,500
	103	dsl	750	Gar-Den 700	800	13,500
Cactus Drlg Ltd	12	dsl	1554	National 80-B	1554	15,000
	28	dsl	1200	Brewster N-75	1200	12,500
Cliffs Drlg	14	dsl	600	EMSCO MJ-1250	600	15,000
	36	dsl	700	EMSCO JB-1250	1000	16,000
	6	dsl	800	National 610	800	12,500
Drilcon	2	dsl	1176	National 80-B	1176	14,500
Dual Drlg	17	dsl	1650	Bethlehem M-58	1100	12,500
	3	dsl	1500	Wilson 120	1650	15,000
	4	dsl	1900	National 110	1500	19,000
Helmerich & Payne Intl Drlg	38	dsl	1600	National 80	1365	16,000
	88	dsl-elec	1700	OILWELL 860	1000	16,000
Kenai Drlg Rocky Mountain	1	dsl	2200	EMSCO A-800	2450	15,000
	12	dsl	1000	National 50-A	950	10,000
Kenting Drlg	6	dsl	1500	Brewster N-85	1500	14,500
Kissinger Petroleum	5	dsl	2000	OIME 1500-SL	1500	15,000
Nicor Drlg	27	dsl	1500	Brewster N-95	1200	16,000
Nobel Drlg	N-82	dsl	1200	National 80	1200	15,000
	N-88	dsl	1200	National 80-B	1200	15,000
	N-811	dsl	1606	National 80-B	1606	15,000
	814	dsl	1606	National 80-B	1606	15,000
Parker Drlg	169	dsl	1650	OIME 1500-P	1650	20,000
Penrod Drlg	104		2000	National 80-B	1760	15,000
Republic Drlg & Serv	3	dsl-elec	1200	OILWELL 740-E	1000	14,000
Transcontinental Drlg	31	dsl	1850	Wilson 90-B	300	15,000
	38	dsl	1750	Gar-Den GD-800	1836	15,000
	39	dsl		Gar-Den GD-800	1224	13,500
	50	dsl	2000	Gar-Den GD-800	1400	15,000
Universal Drlg	2	dsl-elec	1000	Wilson 90-E	1300	13,000
MC LEAN						
Atco Drlg	8	dsl	1230	EMSCO A-550	1230	12,000
MERCER						
Blocker Drlg Canada	7	dsl	1550	OIME 750-SL	1500	14,000
MORTON						
Bomac Drlg	46	dsl	1300	National 610	1200	11,500
MOUNTRAIL						
Blocker Drlg Canada	9	dsl	1600	OIME 750-SL	1155	14,000
Bomac Drlg	26	dsl	950	M-CSCO U-15	920	9,500

NORTH DAKOTA (Cont'd)

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
MOUNTRAIL (Contd)						
True Drlg	21	dsl	1800	National 80-B	1800	15,000
RENVILLE						
Cardinal Drlg	12	dsl	400	National T-20	400	6,000/3½"
	5	dsl	541	EMSCO 250	560	7,500/4"
STARK						
Cyclone Drlg	3	dsl	1250	Unit U-30	1250	15,000
True Drlg	17	dsl	1350	National 50-A	1000	12,000
	23	dsl	1800	M-CSCO U-712-A	1800	16,000
WARD						
Bomac Drlg	21	dsl	380	Ideco H-35	330	7,000
Cardinal Drlg	6	dsl	560	EMSCO 250	440	6,000/4"
WILLIAMS						
Anderson-Myers Drlg	16	dsl	2300	National 55	1200	13,000
Blocker Drlg Canada	5	dsl	1550	Brewster N-75	1425	12,000
Bomac Drlg	27	dsl	700	Brewster N-55	920	10,000
	34	dsl	700	Brewster N-7	700	10,500
	53	dsl	2000	National 80-B	1800	16,000
Brown Tom	23	dsl	1100	National 75-CA	1100	13,000
Cardinal Drlg	22	dsl	1100	National 80-B	1650	15,000
Noble Drlg	OW-861	dsl	2400	OILWELL 860	2400	18,000
Penrod Drlg	105	dsl	1575	National 80-B	1760	15,000
Pruet-Ram Co	2	dsl	3000	EMSCO C-1	3000	20,000
Shelby Drlg	52	dsl	1500	OIME SL-7	1500	16,000
Tierra Drlg	14	dsl-elec	1000	BDW 800-MX	750	14,000
WILLISTON						
Hi Tower Drlg	8	dsl	1200	OILWELL 76	1200	10,500
Lemkco Drlg	2	dsl	800	OIME SD3/si	800	10,500
Sharp Drlg	370	dsl-elec	2000	Unit U-712-EC	1545	18,000

OHIO

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
UNDESIGNATED						
Apache Drlg	1	dsl	300	Failing	260	3,500
Midwest Drlg	11	dsl	550	Cooper LTD-550	550	8,500
Mutual of America	2	dsl	145	Mayhew 3000	280	3,000
	4	dsl	220	Waleneer R-2	280	5,000
PEP Drlg	4	dsl	470	Brewster N-35	470	7,000
ASHTABULA						
PEP Drlg	2	dsl	470	Ideco H-35-S	470	6,500
	5	dsl	550	Gar-Den 500-M	500	7,000
COLUMBIANA						
Armstrong Drlg	27	dsl		Wilson Mogul 42	280	7,500
DARKE						
Armstrong Drlg	10	dsl	380	Mayhew 3000 Port	350	4,000
GUERNSEY						
Mid Atlantic Oil	1	dsl	400	Brewster N-4	400	6,000
MUSKINGUM						
PEP Drlg	3	dsl	470	National T-45	470	7,500
NOBLE						
Mid Atlantic Oil	2	dsl		Ideco Rambler 5525	480	7,000
PERRY						
Hurt & Assoc Clint	6	dsl	350	Wilson Super 38	500	7,000
PORTAGE						
Midwest Drlg	111	dsl	425	Cooper LTD-350	425	7,500
PEP Drlg	1	dsl	470	EMSCO WS-1	470	7,500
	7	dsl	470	EMSCO WS-1	470	7,500
TRUMBULL						
Armstrong Drlg	11	dsl	380	Cabot/Franks	280	7,500
	12	dsl	380	Mayhew 3000	318	4,000
WASHINGTON						
Comanche Drlg Inc	1	dsl	300	Ewbanks SS-40	320	3,500
FWA Drlg	15	dsl	350	Wilson 38	350	4,500
	22	dsl	350	Wilson Super 38	350	4,500
	23	dsl	375	Wilson Super 38	400	6,000
Hurt Clint & Assoc	5	dsl	350	Wilson Super 38	350	5,000
Shawnee Drlg	1	dsl	300	Ewbanks SS-40	260	3,500
WAYNE						
Midwest Drlg	7	dsl	425	Ideco H-35	425	5,000
	77	dsl	425	Ideco H-35	425	5,000

OKLAHOMA

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
UNDESIGNATED						
Austin Jimmie & Sons		dsl	900	Brewster N-75	900	14,000
		dsl	900	EMSCO 450	900	12,000
		dsl	1000	BDW 800-MI	900	15,000
		dsl	900	M-CSCO U-36	900	12,000
Austin Drlg		gas	700	Brewster N-75	900	14,000
		gas	600	M-CSCO	700	11
		dsl	900	M-CSCO U-36-57	1000	12,000
Austin-Dunham		dsl	850	Brewster N-75	850	15,000
		gas	1000	Brewster 75	1000	15,000
		gas	350	National 50	600	12,000
Cyclone Drlg & Workover	11	dsl	1342	Unit U-34	400	600
	7	dsl	400	Unit U-34	955	
	8	dsl	800	Unit U-34	1342	6,000

OKLAHOMA (Cont'd)

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
UNDESIGNATED (Contd)						
Honeymon Drlg	5	dsl	600	OIME SD-5	784	12,000
	7	dsl	600	OIME SD-5	784	12,000
	8	dsl-elec	750	OIME SD-7-E	2000	16,000
	9	dsl	600	BDW-800 MX	1500	16,000
Johnson Bates Drlg	3	dsl	1100	M-CSCO U-34	1100	10,500
Magic Circle Drlg	17	dsl	2460	OILWELL 96	2460	20,000
Moran Bros	68	dsl-elec	3200	EMSCO C-2	2000	25,000
Pilgrim Drlg	3	dsl-elec	2500	EMSCO 1500-E	2500	25,000
Quarles Drlg	11	dsl	2600	M-CSCO U-914-C	2400	22,000
	12	dsl	2600	M-CSCO U-914-C	2400	22,000
	14	dsl	2600	M-CSCO U-914-C	2400	22,000
	15	dsl	2000	RMI 1000	1000	22,000
Quintex Drlg	4	dsl	445	Ewbanks Double Drum	250	3,000
Repco	8-H	dsl	636	Hopper	350	7,000
S & T Northern	6	dsl	1100	National 610	1100	11,500
	8	dsl	1500	National 610	1500	11,500
Santa Fe Drlg	SFW-18	dsl-elec	1700	OILWELL E-2000	20000	25,000
TRG Drlg	133	dsl	2000	Gar-Den 1100-E	2400	18,000
	134	dsl	2200	Gar-Den 1500-E	2400	22,000
	135	dsl	2200	Gar-Den 1500-E	2400	22,000
ALFALFA						
Bonray Drlg	6	gas	700	National 50-A	700	9,000
Gabbert-Jones	8	dsl	310	National T-32	310	5,500
Hughes Drlg	8	dsl	500	Ideco H-35	300	6,200
Lohmann-Johnson Drlg	8	dsl	300	National 32	550	7,500
Thomas Drlg	5	dsl	300	Wilson Giant	300	7,500
	8	dsl	300	Ideco H-35	300	7,500
ATOKA						
Big Chief Drlg	25	dsl	3000	National 110	2000	20,000
BEAVER						
Damac Drlg	3	dsl	620	Wilson Mogul	620	9,500
Eagle Drlg Inc	2	dsl	1000	National T-45	725	9,500
Freeman Drlg	1	dsl	525	Ideco H-40	600	8,500
Lohmann-Johnson Drlg	10	dsl	350	National 50	600	5,500
	18	dsl	300	M-CSCO Unit 15 S/N 239	400	6,000
Nicor Drlg	5	dsl	1000	Bethlehem C-50	450	10,000
Service Drlg (TX)	9	dsl	EMSCO DB55	M-CSCO U-15	9200	
Zenith Drlg	2	dsl	600	EMSCO GB-350	600	8,500
BECKHAM						
Baker & Taylor Drlg	4	dsl	1140	M-CSCO U-20	1140	18,000
Big Chief Drlg	45	dsl	1500	Brewster N-95-A	2250	18,000
Helmerich & Payne Intl Drlg	49	dsl	2000	National 110	1650	16,000
Loffland Bros	306	gas	1150	Brewster N-95	1300	17,000
	34	dsl-elec	3500	M-CSCO U-1220	2500	25,000
Mercury Drlg	5	dsl	1350	Gar-Den 1100	2775	22,000
Moran Bros	36	dsl-elec	2300	Brewster N-12	2000	20,000
	66	dsl	1400	Brewster N-75-A	1000	14,000
Noble Drlg	N-115	dsl	2130	National 110	2130	20,000
	N-117	dsl	3645	National 110-UE	3645	20,000
Parker Drlg	142	dsl	3000	National 1320-E	3000	25,000
	167	dsl	1650	OIME SL-1500	1650	20,000
	181	dsl	3000	OIME Hercules 3000-E	3000	30,000
	182	dsl	3000	OIME Hercules 3000-E	3000	30,000
	201	dsl	3000	OIME E-4000	4000	40,000
	208	gas	2450	Ideco 7-11	2000	18,000
	210	dsl	2700	OIME 1500-6	2050	22,000
	212	dsl	3000	OIME 2000	4000	25,000
	214	gas	2000	OIME 1500-C	2000	22,000
Penrod Drlg	26	dsl	2600	EMSCO C-2	1950	25,000
Rowan Drlg U S	14	dsl	3200	National 1625-M	3000	35,000
	7	dsl	3200	EMSCO A-1500	2500	22,000
	30	dsl	2600	EMSCO A-1500	2400	22,000
Smart Drlg	7	dsl	1200	Unit U-20	1200	16,000
TRG Drlg	10	dsl	3000	Gar-Den 3000-E	3000	30,000
	18	dsl-elec	2200	Gar-Den 1500-E	2400	22,000
Tri-Land Drlg	1	dsl	1500	Gar-Den 1500-E	1500	21,000/5"
Triad Drlg	8	dsl		Gar-Den 1500		24,000
Trigg Drlg Co	2	gas-btne	700	National 75	900	12,000
URC Drlg	4	dsl-elec	1500	M-CSCO 914-C	1500	22,000
	5	dsl	2250	M-CSCO 1220	2250	25,000
BLAINE						
Astro Drlg	16	dsl	920	National 50-A	920	11,000
	19	dsl	912	Wilson Super Giant	912	12,500
Bonray Drlg	3	gas	900	Brewster N-7	900	10,500
Cactus Drlg (TX)	32	dsl	1560	National 100	1740	18,000
FWA Drlg	10	dsl	1000	Wilson Giant	800	10,750
	21	dsl	1000	Wilson Mogul 42	800	9,500
Harper-Turner Drlg	2	dsl	800	National 50	820	10,500
Mercury Drlg	2	dsl	750	EMSCO Unit U-15	940	12,000
Moran Bros	35	dsl-elec	1700	OILWELL 76	1200	15,000
Nicor Drlg	28	dsl	600	Unit U-15	700	11,500
Robinson Bros Drlg	5	dsl	1000	OILWELL 66	900	11,000
	11	dsl	600	Brewster N-45	600	10,000
TRG Drlg	22	dsl	1290	National 80-B	1305	14,500
	3	dsl	995	Unit U-15	1305	10,500
Unit Drlg & Expl	24	dsl	400	8006-D	960	14,000
Viersen & Cochran Drlg	20	dsl	1245	National 610	1245	13,000

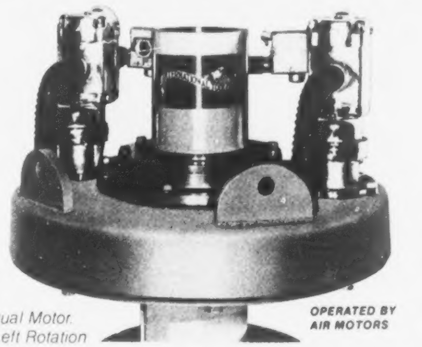
OKLAHOMA (Cont'd)

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
BRYAN						
Pilgrim Drlg	1	dsl	750	Ideco H-35	600	8,000
Schlensker Drlg	4	gas	700	Unit U-15	800	10,000
CADDO						
Big Chief Drlg	40	dsl-elec	3000	EMSCO Electro-hoist III	4200	25,000
	44	dsl	2400	Brewster N-95	2400	20,000
Bonray Drlg	32	dsl	1600	National 110	1600	20,000
Centennial Expl & Drlg	RT-1800	dsl	400			2,500
Dual Drlg	15	dsl	2600	Wilson 150-A	1650	19,000
	20	dsl	2800	OILWELL 860	1400	22,000
FWA Drlg	19	dsl	1200	Wilson Titan	1050	13,500
	5	dsl	1000	Wilson Giant	800	11,000
Harper-Turner Drlg	11	dsl	2000	National 110	1500	20,000
ITT Eason Oil	21	dsl-elec	2000	EMSCO D-2	750	13,000
	22	dsl	2600	EMSCO C-1-E	1500	21,000
	23	dsl	3200	EMSCO C-1-E	3000	30,000
	24	dsl	2600	EMSCO C-1-E	1500	21,000
Mercury Drlg	1	dsl	1000	EMSCO 800	1470	16,000
	10	dsl	1000	Gar-Den 800	2000	18,000
Moran E W Drlg	27	dsl-elec	3200	Gar-Den 1500-E	2000	25,000
Nicor Drlg	1	dsl	1200	M-CSCO U-20	1500	15,000
	10	dsl	2000	M-CSCO U-914-C	1400	18,000
	11	dsl	2100	M-CSCO U-1220-B	2000	21,000
	33	dsl-elec	2000	M-CSCO U-914-EC	1400	18,000
	34	dsl-elec	2000	M-CSCO U-914-EC	1400	18,000
	35	dsl-elec	2000	M-CSCO U-914-EC	1400	18,000
	4	dsl	1500	Gar-Den 800	1000	15,000
	6	dsl	1500	National 55	700	13,500
	65	dsl-elec	2700	M-CSCO U-914-EC	1400	18,000
	9	dsl	2000	OIME 1500-SL	1500	18,000
	30	dsl	2000	M-CSCO U-914-C	1400	18,000
Parker Drlg	172	dsl	1650	OIME SL-1500-P	1650	20,000
	204	dsl	2700	OIME E-1500-C	2250	22,000
Schlensker Drlg	10	gas	900	Gar-Den 800-M	1350	16,000
Top Drlg	2	dsl	1200	OILWELL 660	1200	14,000
Tri-Service Drlg	9	dsl	2475	National 1320-M	2475	22,000
Unit Drlg & Expl	20	dsl	1000	Gar-Den	1300	15,000
	27	dsl-elec	1600	Gar-Den 1500-E	2000	25,000
Viersen & Cochran Drlg	1	dsl	800	OILWELL 660	800	12,000
	16	dsl	3200	National 1320-UE	3417	25,000
	19	dsl	800	National 610	830	12,000
	3	dsl	800	National 75-CA	800	14,000
Westburne Drlg	67	dsl	1725	OILWELL 96	1725	20,000
	68	dsl	1800	Unit U-1220	1950	20,000
CANADIAN						
Basin Drlg	6	dsl	650	Brewster N-7	850	9,500
	8	dsl	600	Gar-Den 500	850	12,500
Big Chief Drlg	24	gas	1200	M-CSCO U-15	900	11,000
	41	gas	1400	Brewster N-75	900	12,000
Bonray Drlg	22	dsl	800	Ideco H-525	800	9,500
	4	gas	900	Unit U-40	900	14,000
Cactus Drlg (TX)	6	dsl	1040	Ideco 7-11	1160	14,000
	32	dsl	1600	National 100	2100	20,000
Drillers	26	dsl	700	EMSCO GB-500	700	10,000
Honeymon Drlg	1	dsl	800	National 50-A	800	12,000
	2	dsl-elec	750	Ideco E-900	750	4,000
Magic Circle Drlg	15	dsl	900	EMSCO U-15	900	12,000
Mercury Drlg	6	dsl	750	EMSCO 500	1470	14,000
Nicor Drlg	12	dsl	800	Gar-Den 700-M	1050	13,000
Rine Drlg	9	dsl	1000	Gar-Den 800	1000	13,500
Robinson Bros Drlg	GBL	dsl	1250	Ideco 1200	1000	12,000
	3	dsl	1000	Wilson 75	900	9,000
Schlensker Drlg	2	gas	700	Bethlehem MC-450	900	12,000
Thomas Drlg	9	dsl	640	Brewster N-46	640	12,000
Unit Drlg & Expl	10	Unit U-15	1000	Bethlehem M-58	1200	14,000
Viersen & Cochran Drlg	12	gas	500	National 50	800	9,000
Warren Interstate Drlg	1	dsl	1000	Cabot/Franks 2042-TDHT	700	10,700
CARTER						
Ardmore Drlg	4	gas	600	Wilson	400	500
Astro Drlg	20	dsl	550	Cabot/Franks 550	456	8,500
Big Chief Drlg	12	gas	1600	National 80-B	1600	14,000
Compadre Drlg & Expl	1	dsl	360	Walker-Neer A-250-40	360	6,000
Nicor Drlg	58	dsl	1100	M-CSCO U-15	700	12,000
Schlensker Drlg	1	gas	700	National 75-CA	1050	14,000
Triple H Drlg	1	dsl	1000	National 50-A	1100	10,500
	2	dsl	1000	Ideco 10,000	1100	14,000
	3	dsl	1500	National 100	1500	15,000
CIMARRON						
Gabbert-Jones	11	dsl	310	National T-20	275	5,000
Service Drlg (OK)	3	dsl	300	Unit R-U34	400	6,500
	3	dsl	320	M-CSCO U-34	450	6,500
CLEVELAND						
Bodard & Hale Drlg	14	dsl	400	Brewster N-4	450	7,000
Drillers	30	dsl-elec	1600	Unit U-15-M	1000	11,000
Johnson-Bates Drlg	5	dsl	1000	M-CSCO U-15	1100	10,000
Magic Circle Drlg	12	dsl	900	National 50-A	900	12,000
Quarles Drlg	4	gas	1000	EMSCO GB-500	500	12,000

OIL FIELD POWER TOOLS

KELLY SPINNER®
MODEL A-6C

Makes Connections Faster and Safer
Saves Up To 60% In Connection Time



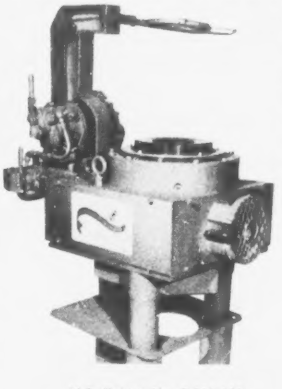
A-6C-2 Dual Motor Right or Left Rotation

OPERATED BY AIR MOTORS

U.S. Patents
No. 3,144,085 and No. 3,212,578

The Model A-6C International Tool Company KELLY SPINNER® is designed specifically to save time and money and to increase safety when making connections on drilling rigs. *It can save up to 60% connection time.* The tool eliminates the spinning chain on connections. It is endorsed by both operators and crews.

INTERNATIONAL
MOUSE HOLE BACK-UP® TOOL



Speeds up connection time when adding pipe to drilling string • Is fully automatic • Provides maximum safety for rig floor personnel • Eliminates need for back-up tongs • Easy to operate and maintain

Write for literature.

U.S. Patent No. 3,293,959

INTERNATIONAL TOOL CO., INC.

INTERNATIONAL
TOOL COMPANY, INC.

7339 Kingsley / P.O. Box 803 / Houston, Texas 77001
Telephone (713) 641-0373
Cable Address: INTLTOOLCO

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
OKLAHOMA (Cont'd)						
CLEVELAND (Contd)						
Scott Jerry Drlg	6	dsl	1342	EMSCO Unit MU-15	1342	10,500
Trigg Drlg	4	dsl	700	National 75	950	12,000
	5	gas-btne	500	National 50-A	800	10,000
COMANCHE						
Amoy Drlg & Well Serv	40	dsl	2300	National 1320	2300	12,000
Loffland Bros	200	dsl-elec	3200	CE 3000 Type 2	3000	38,000
Moran E W Drlg	22	dsl-elec	3200	EMSCO C-3	3000	30,000
Nicor Drlg	29	dsl-elec	2700	Gar-Den E-1500	2000	25,000/5"
	3	dsl	1000	M-CSCO U-15	700	11,500
Parker Drlg	114	dsl-elec	2700	Ideco 3000-E	2700	30,000
	186	dsl	2000	OIME 1500	2000	22,000
	193	dsl	4000	OIME 3000-E	4000	30,000
	196	dsl	2000	OIME E-3000	4000	30,000
	203	dsl	2700	OIME E-2000	3000	25,000
	205	dsl	2700	OIME 1500-C	2250	22,000
Ratliff Drlg	1	dsl	2640	OILWELL 96	2640	24,000
Resource Drlg	RD-22	dsl	3105	National 1320	3740	25,000
Robinson Bros Drlg	Gary Jack	dsl-elec	2000	Gar-Den	2000	18,000
CREEK						
McLennan Drlg	4	dsl	318	Gar-Den	238	2,000/3½"
Whitehead E E Drlg Contr	1	dsl	450	Wilson Model 30	425	4,000
CUSTER						
Baski Drlg	7	dsl	450	Ideco H-30-D	350	5,000
Bonray Drlg	1	dsl	1230	EMSCO J-1000	1230	16,000
	20	dsl	1680	Ideco Super 711	1680	17,000
	21	dsl	990	Ideco H-750	660	12,000
	30	dsl	2400	National 1320	2400	25,000
	31	dsl	2400	National 1320	2400	25,000
Cliffs Drlg	38	dsl	1400	OILWELL 840-E	800	16,000
Eagle Drlg Inc	3	dsl	1100	BDW-800	1500	14,000
FWA Drlg	7	dsl	1200	Wilson Titan	900	13,500
Harper-Turner Drlg	1	dsl	800	National 55	1000	12,000
	10	dsl	2000	National 80-B	1500	16,000
Honeymon Drlg	14	dsl	700	BDW-800	1000	14,000
ITT Eason Oil	12	dsl	2000	National 80-B	1200	16,000
	20	dsl-elec	2000	EMSCO D-3	1000	16,000
Loffland Bros	324	dsl	2250	Gar-Den 1500	2500	24,000
Moran E W Drlg	11	dsl	2600	Wilson 150-A	1500	20,000
	4	dsl	1300	Wilson 120	1000	15,000
Noble Drlg	N-114	dsl	2090	National 110	2090	18,000
Parker Drlg	170	dsl	1650	OIME SL-1500-P	1650	20,000
Quarles Drlg	3	dsl	2000	OIME 1000	1000	18,000
	9	dsl	2000	OIME SD-7E	1000	22,000
Ratliff Drlg	30	dsl	1650	Texas Flange	1650	18,000
Resource Drlg	1	dsl	3105	National 1320	3740	25,000
Rine Drlg	6	gas	700	Brewster N-75	750	12,000
	7	dsl	750	Gar-Den 700	750	13,500
Robinson Bros Drlg	4	dsl	1000	National 50	800	11,000
Search Drlg	3	dsl	956	Ideco H-725-C	950	10,000
TRG Drlg	1	dsl	1245	National 75	1305	13,500
	130	dsl	2200	Gar-Den 1100-E	2400	18,000
	2	dsl	825	Unit U-15	870	10,000
	20		2200	Gar-Den 1100-E	2400	18,000
Top Drlg	1	dsl	650	Brewster N-7	650	10,000
Triad Drlg	5	dsl		Ideco Super 750	1100	14,000
Unit Drlg & Expl	25	dsl	400	Gar-Den 700 G-D	960	14,000
	26	dsl	400	National 75	800	14,000
Viersen & Cochran Drlg	5	dsl	600	OILWELL 660	800	12,000
Wilson Bros Drlg	14	dsl	2600	National 110	2700	20,000
DEWEY						
Cactus Drlg Corp	6	dsl	1070	Ideco 7-11	1400	14,000
Hickman Drlg	5	dsl	1450	BDW 800	1100	14,000
Loffland Bros	73	dsl-elec	2160	M-CSCO U-712-A	2200	18,000
Moran Bros	33	dsl-elec	2600	National 110	2000	20,000
Nicor Drlg	2	dsl	1300	M-CSCO U-15	700	12,000
Noble Drlg	N-83	dsl	1530	National 80-B	1530	15,000
	N-85	dsl	1830	National 80-B	1830	15,000
Project 5 Drlg	10	dsl-elec		S-L-5	1155	12,000
	12	dsl-elec		J-1250	1800	14,000
Rine Drlg	4	gas	750	Brewster N-75	750	12,000
Robinson Bros Drlg	10	dsl	600	Brewster N-45	600	19,000
Smart Drlg	3	dsl	500	M-CSCO Unit U-15-A	1000	13,000
	5	dsl	600	National 50-CA	950	11,000
Top Drlg	5	dsl	1000	M-CSCO U-15	1000	104/½"
Trend Drlg	3	dsl	1000	National 75	1200	12
Triad Drlg	3	dsl		Brewster N-55	800	12,000
	4	dsl		Brewster N-7	800	11,000
Viersen & Cochran Drlg	2	dsl	600	National 55	800	12,000

Circle 309 on Reader Service Card

OKLAHOMA (Cont'd)

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
ELLIS						
Baker & Taylor Drlg	8	dsl	870	M-CSCO U-15	870	11,000
Cactus Drlg (TX)	33	dsl	1560	National 100	1740	16,000
Hickman Drlg	6	dsl	1450	BDW-800	1100	14,000
Moran E W Drlg	13	dsl	1400	Gar-Den 700	1000	12,500
	2	dsl	1500	Gar-Den 700	1000	13,500
Pulliam Drlg	11	dsl	2400	National 80-B	1600	15,000
	12	dsl	1600	National 50-A	1200	11,000
Quarles Drlg	7	dsl	1050	National 75-CA	800	14,000
Ratliff Drlg	7	gas-btne	1020	National 75-CB	1020	15,000
Sage Drlg	4	dsl	800	M-CSCO U-15	800	9,500
Search Drlg	2	dsl	950	Ideco H-725-C	950	10,000
Triad Drlg	6	dsl		Brewster N-95-A	1650	20,000
Unit Drlg & Expl	9	dsl	600	Brewster N-55	1050	10,000
Viersen & Cochran Drlg	17	dsl	600	OILWELL 660	830	12,000
GARFIELD						
Basin Drlg	10	dsl	600	M-CSCO U-15	850	10,000
	3	dsl	650	M-CSCO U-15	850	9,500
Cyclone Drlg & Workover	12	dsl	800	Unit U-34		600
FWA Drlg	6	dsl	1000	Wilson Giant	800	9,500
Hughes Drlg	1	dsl	500	Ideco H-35	450	8,000
Iron Drlg	1	dsl	500	Unit U-35-A	450	7,000
	3	dsl	1050	Bethlehem S-45-E	600	8,000
Logan Drlg	5	dsl	1350	Superior 700-M	900	10,000
Ratliff Drlg	11	dsl	850	Brewster N-7	850	10,000
Sabre Drlg Div TRG Drlg	8	dsl	1050	M-CSCO U-15	1050	9,000
Unit Drlg & Expl	22	gas	350	National 50	500	10,000
GARVIN						
Ardmore Drlg	1	dsl	450	Ideco H-30-D	450	5,000
	2	gas	700	Wilson Giant	700	9,000
Big Chief Drlg	20	gas	1200	M-CSCO U-40	960	13,500
Bodard & Hale Drlg	10	dsl	450	OILWELL 52-T	600	9,000
	7	dsl	400	Bethlehem S-55	600	8,000
	9	dsl	550	Bethlehem S-55	700	9,000
Bonray Drlg	5	gas	700	National 5[illegible]-A	700	9,[illegible]00
Johnson Bates Drlg	4	dsl	400	M-CSCO U-34	375	6,500
Moran E W Drlg	20	dsl	850	Spencer 7000	550	8,000
	24	dsl	850	Spencer 7000	550	8,000
	26	dsl	850	CEI-6000	600	9,000
Ratliff Drlg	16	dsl	750	Unit U-15	750	10,000
	2	gas	1020	National 55	1020	14,000
	5	dsl	1100	National 75-CS	1100	15,000
Scott Jerry Drlg	4	dsl	600	Bethlehem C-50	640	10,000
Tierra Drlg	15		1000	M-CSCO U-712-EA	1200	16,000
GRADY						
Arden Drlg	3	dsl	2500	EMSCO C-1	1500	20,000
	4	dsl	1800	EMSCO D-2	1000	16,000
	5	dsl-elec	2400	EMSCO D-3	2000	18,000
Arrowhead Drlg	C-3	dsl	1040	National 610	1040	12,000
Big Chief Drlg	22	gas	1600	National 80-B	1600	14,000
	35	gas	2610	National 110	2610	20,000
Chiles Drlg	7	dsl	1600	National 0-610	1000	12,000
Cliffs Drlg	43	dsl	1300	National 1320-UE	1300	25,000
Dual Drlg	26		18000	Wilson 150-A	1650	16,000
Helmerich & Payne Intl Drlg	8	dsl	950	National 55	950	15,000
	84	scr	1100	OILWELL 760-E	850	
Honeymon Drlg	4	dsl	1500	OIME S/L 1500	1500	18,000
	6	dsl	1000	OIME S/L 7	1500	16,000
ITT Eason Oil	17	dsl	2600	EMSCO C-1	2000	21,000
	18	dsl-elec	2300	EMSCO C-1E	1500	21,000
	19	dsl	1800	EMSCO D-2	750	13,000
Johnson Bates Drlg	6	dsl	1560	M-CSCO U-20	1040	16,000
	7	dsl	1000	Wilson Titan	1350	12,000
Loffland Bros	111	dsl-elec	3300	EMSCO A-1500	2200	24,000
	206	gas-elec	2160	M-CSCO U-914-B	2200	20,000
	99	gas	1300	M-CSCO U-20	1645	15,000
Mercury Drlg	12	dsl	2010	Gar-Den 800	2010	20,000
	7	dsl	1000	Gar-Den 800-M	2000	18,000
	8	dsl	1000	Gar-Den M-700	1470	18,000
Nicor Drlg	15	dsl	1000	OILWELL 76	2100	15,000
Parker Drlg	179	dsl	3000	OIME Hercules 3000-E	3000	30,000
Pilgrim Drlg	2	dsl	1500	OILWELL 76	1500	16,000
Quarles Drlg	10	dsl	2600	M-CSCO U-914-C	2400	22,000
Ratliff Drlg	14	dsl	2640	M-CSCO U-1220-B	2640	28,000
Sandia Drlg	1	dsl	3000	Gar-Den E-800	3000	18,000
	5	dsl	2000	EMSCO D-2	2000	16,000
Smart Drlg	10	dsl	1000	M-CSCO U-20	1500	18,000
	2	dsl-elec	677	M-CSCO Unit 36	1000	14,000
	9	dsl	1000	M-CSCO U-15	950	13,000
TRG Drlg	14	dsl-elec	2000	Gar-Den 1100-E	2400	18,000
Unit Drlg & Expl	8	dsl	700	National 55	1588	14,000
Viersen & Cochran Drlg	10	dsl	2000	National 100	1040	17,000
	15	dsl	1010	OILWELL 660	830	13,000
Wilson Bros Drlg	15	dsl	2600	National 110	2700	20,000
GRANT						
Trend Drlg	2	dsl	500	Ideco H-35	500	7,500
HARPER						
Drillers	23	dsl	600	Unit U-15	600	10,000
	36	dsl	600	EMSCO GB-500	700	9,500
Nicor Drlg	14	dsl	625	Gar-Den 500-M	650	10,000

OKLAHOMA (Cont'd)

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
HARPER (Contd)						
Pulliam Drlg	18	dsl	900	EMSCO GA-250-T	350	8,000
Rine Drlg	10	dsl	550	Brewster		9,500
	3	dsl	750	Brewster N-55	750	9,500
Sage Drlg	5	dsl	400	National T-32	400	6,700
Triad Drlg	1	dsl		National T-32	350	8,000
Unit Drlg & Expl	1	dsl	500	Unit U-15	800	10,000
HASKELL						
Astro Drlg	22	dsl	920	Bethlehem M-58	920	12,000
Dual Drlg	2	dsl	950	Wilson Giant	650	9,500
Miller Drlg	102	gas	675	M-CSCO U-15	675	12,000
	116	gas	300	Spencer 7000	380	7,500
Moran E W Drlg	16	dsl	750	Spencer 7000	500	8,000
Unit Drlg & Expl	17	dsl	700	Gar-Den 700	1300	14,000
HUGHES						
Rockwell Drlg	20	dsl	670	Mac-350	550	6,500
	22	dsl	670	EMSCO G-36	450	7,000
KAY						
Hughes Drlg	15	dsl	500	Cabot/Franks 550	450	7,500
	6	dsl	500	Ideco H-35	300	6,200
McLennan Drlg	5	dsl	450	Cabot/Franks 658	318	4,000
KINGFISHER						
A & P Drlg	1	gas	775	EMSCO 450	225	9,000
	2	gas	825	EMSCO 500	275	9,000
Astro Drlg	17	dsl	800	Cabot/Franks 750	700	11,000
BF & B Drlg	1	dsl	600	Unit U-15	600	10,000
	3	gas	800	National 50	800	10,000
Basin Drlg	1	dsl	650	EMSCO GB-500	850	9,500
	14	dsl	650	Brewster N-45	850	8,500
	2	dsl	650	National 50-A	850	9,500
	5	dsl	600	National CA-75	850	11,000
	9	dsl	600	M-CSCO U-15	850	10,000
Big Chief Drlg	36	gas	1400	National 55	900	11,000
Bodard & Hale Drlg	5	dsl	400	M-CSCO U-34	400	6,500
Cactus Drlg (TX)	56	dsl	800	Brewster N-55	1000	9,000
Cactus Drlg Corp	33	dsl	1050	National 100	1650	16,000
Falcon Drlg	1	dsl	400	Bethlehem S-45-A	400	7,000
Hughes Drlg	4	dsl	550	Ideco H-44	600	9,000
Logan Drlg	4	dsl	1200	BDW 650	900	10,000
Magic Circle Drlg	11	dsl	900	National 50-A	900	10,000
Nicor Drlg	7	dsl	1020	M-CSCO U-15	700	11,500
Ratliff Drlg	12	dsl	700	Gar-Den 500-M	700	12,000
Thomas Drlg	4	dsl	500	EMSCO 500	500	10,000
Top Drlg	4	dsl	1200	OILWELL 660	1200	14,000
Trend Drlg	1	dsl	500	M-CSCO U-15-A	700	10
	6	dsl	1100	Ideco 725	1100	12,000
	8	dsl	1100	Ideco 7525	1100	10,500
Unit Drlg & Expl	23	dsl	350	21-15	600	10,000
Viersen & Cochran Drlg	4	dsl	600	National 55	800	12,000
KIOWA						
Moran E W Drlg	30	dsl-elec	2600	Gar-Den 1500-E	2000	25,000
LATIMER						
Cactus Drlg (TX)	51	dsl	800	Brewster N-55	1000	9,000
Miller Drlg	106	gas	900	National 75	900	13,500
	110	dsl	1500	OIME SL-1500	1500	20,000
LE FLORE						
Dual Drlg	18	dsl	1850	Bethlehem M-810	1100	15,000
LINCOLN						
Cyclone Drlg & Workover	9	dsl	800	Unit U-34	400	6,000
Project 5 Drlg	9	dsl		Cardwell J-4	850	10,000
LOGAN						
Harper-Turner Drlg	12	dsl	600	Cooper	700	9,000
Fisher Drlg Corp	1	dsl	450	Brewster N-4	450	6,500
Hughes Drlg	10	dsl	500	Cabot/Franks 550	450	7,500
	7	dsl	500	Ideco H-37	450	8,000
Johnson Bates Drlg	1	gas	350	M-CSCO U-34	300	5,700
	2	gas	325	M-CSCO U-34	245	6,500
Porter Gene Drlg	1	dsl	600	M-CSCO U-34	435	6,000
Project 5 Drlg	3	dsl		Unit U-34	450	6,500
	5	dsl		American 250-BDW	450	6,500
Sabre Drlg Div TRG Drlg	6	dsl	450	National T-20	335	6,000
	7	dsl	600	M-CSCO U-15	450	7,500
	9	dsl	450	M-CSCO U-34	450	6,000
Sloan Drlg	18	dsl	450	Wilson 42	450	7,000
Sumpter & Barker Drlg	1	dsl	930	Wilson Mogul 42 Trailer Mounted	430	6,500
LOVE						
Astro Drlg	24	dsl	825	Brewster N-55	825	12,500
Big Chief Drlg	42	dsl	1800	National 80	1800	15,000
Burns L D Drlg	1	dsl	1020	Sea Coast 1000-4S	744	12,000
	2	dsl	830	Wilson 75	600	10,500
	3	dsl	669	Wilson 75	600	10,500
Honeymon Drlg Co	3	dsl	1100	OIME S/L 1000	1100	14,000
Moran E W Drlg	12	dsl	950	Bethlehem S-60	700	10,000
	8	dsl	1600	Wilson 150	1000	15,000
Ratliff Drlg	9	gas	700	National 50-A	1020	11,000
Schlensker Drlg	9	dsl	1500	OIME 1500-SL	2205	18,000
TRG Drlg	15	dsl	1000	Wilson Super Atlas	1305	14,000
Westburne Drlg	70	dsl	950	National 50-A	700	9,500

OKLAHOMA (Cont'd)

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
MC CLAIN						
Astro Drlg	15	dsl	912	Super Wilson GI	912	10,500
Big Chief Drlg	11	gas	1350	Brewster N-75	1350	13,000
	43	dsl	2000	National 80-B	2250	16,000
Bodard & Hale Drlg	8	dsl	1100	National 50	1100	10,500
Moran E W Drlg	1	dsl	900	Gar-Den 700	800	12,500
Nicor Drlg	19	dsl	1650	Ideco 750	750	15,000
Project 5 Drlg	8	dsl		EMSCO GB-42	850	10,000
Smart Drlg	6	dsl	700	National 50	950	11,000
	8	dsl	950	Brewster N-55	700	12,000
MC INTOSH						
RWIT Drlg	2	gas-LPG	345	M-CSCO U-34	280	6,000
MAJOR						
Big Chief Drlg	9	dsl	1200	Ideco H-35-S	700	10,000
Harper-Turner Drlg	4	dsl	600	National 50	820	9,000
Hughes Drlg	2	dsl	500	Ideco H-35	450	8,000
	3	dsl	550	EMSCO GB-350	600	10,500
Iron Drlg	2	dsl	900	Unit U-15	600	9,000
Magic Circle Drlg	14	dsl	320	Cabot/Franks 2042	700	9,500
Nicor Drlg	18	dsl	1050	Unit U-15	700	12,500
Ratliff Drlg	10	gas	1020	National 50	1020	10,000
Rine Drlg	5	dsl	700	Brewster N-55	700	9,000
Robinson Bros Drlg	2	dsl	600	OILWELL 66	1000	11,500
Top Drlg	3	dsl	400	OILWELL 500	450	8,500
	6	dsl	350	National T-32	350	7,500
Trend Drlg	5	dsl	900	M-CSCO Unit U-15-CA	900	11
	7	dsl	550	Ideco H-44	608	8,500
URC Drlg	1	dsl	860	National 50	860	10,000
	3	dsl	860	EMSCO 500	860	10,500
Warrior Drlg Co	1	dsl		EMSCO	400	5,000
MARSHALL						
Moran E W Drlg	17	dsl	2600	Wilson 250	1500	20,000
Nicor Drlg	8	dsl	755	National 50-CA	425	11,000
Schlensker Drlg	8	dsl	635	Wilson Mogul 42	475	7,000
Sloan Drlg	16	dsl	400	Wilson 42	600	7,000
Vi-Roi Drlg	1	dsl	435	Wilson Mogul 42	435	6,500
MURRAY						
TRG Drlg	16	dsl-elec	1500	Gar-Den 1100-E	1800	15,000
NOBLE						
Bonray Drlg	7	dsl	476	Cooper 66	318	6,000
Fisher Drlg Corp	4	dsl	450	Wilson Super 38	450	6,000
Hughes Drlg	9	dsl	500	Cabot/Franks 550	400	7,500
Kay Drlg	1	dsl	480	Brewster N-4	480	6,000
	2	dsl	500	Cooper LTD-550	500	8,500
Quanza Drlg	1	dsl	300	National 300-B	300	5,500
NOWATA						
Northeast Drlg	1	dsl	400	Ideco BIR-3084	300	6,200
Winter Drlg & Expl	1	dsl	900	Jaswell J-2400	900	2,400
OKFUSKEE						
Earnest	1	dsl	6500	Cabot/Franks 500	400	6,500
	3	dsl	6500	Cabot/Franks	400	6,500
OKLAHOMA						
Bodard & Hale Drlg	12	dsl	450	Mac-400	525	7,500
	15	dsl	450	Mac-400	525	7,500
	6	dsl	550	National T-20	450	6,500
Cactus Drlg (TX)	57	dsl	520	Ideco H-35	450	6,500
ITT Eason Oil	25	dsl	2600	EMSCO C-1-E	1500	21,000
	26	dsl	3200	EMSCO C-3-E	3000	30,000
Santa Fe Drlg	SFW-17	dsl-elec	1300	National 100	2000	14,000
OKMULGEE						
Earnest	2	dsl	335	Cabot/Franks	318	5,500
OSAGE						
Equity Drlg	150	dsl	300	Failing 2500	300	3,000/3½"
Layton Oil	2	dsl	180	Failing 1500	100	1,500/2⅞"
McLennan Drlg	3	dsl	450	Cabot/Franks Model 137	318	4,500
PAWNEE						
Petra Drlg	24	dsl	300	Cardwell K-510	300	5,000
Quanza Drlg	2	dsl	200	Brewster N-4	300	4,500
PAYNE						
Bodard & Hale Drlg	4	dsl	400	M-CSCO U-34	400	6,500
Equity Drlg	175	dsl	300	Wilson Super 38	300	4,200
Hughes Drlg	5	dsl	500	Ideco H-35	300	6,200
Mar-Tay Drlg	1	dsl	450	Cardwell K-200-C	350	5,000
Venture Drlg	2	dsl	400	Cabot/Franks 750	700	6,500
PITTSBURG						
Arden Drlg	2	dsl	800	EMSCO WS-1	800	12,000
Dual Drlg	10	dsl	1500	Wilson 120	1100	15,000
Lagersen Drlg	4	dsl-elec	2000	EMSCO J-1100-E	2500	18,000
Miller Drlg	14	dsl	600	National 50	600	10,000
RWIT Drlg	8	gas-LPG	345	M-CSCO U-34	280	6,000
	9	gas-LPG	345	Wilson	280	6,000
Sloan Drlg	14	dsl	370	National T-20	500	6,500
PONTOTOC						
Bodard & Hale Drlg	11	dsl	400	Mac-300	450	6,500
Project 5 Drlg	2	dsl		National 50	450	6,500
	7	dsl		Challenger	450	4,000
TEK Drlg	F-1500	gas	350	Failing 1500	350	1,500
PONTOTOC (Contd)						
TEK Drlg	WS	dsl	265	Wilson Super	265	4,500
POTTAWATOMIE						
Bodard & Hale Drlg	16	dsl	550	Ideco H-37	400	6,500
Kingery Drlg	10	gas	300	Wilson Giant	300	5,000
Project 5 Drlg	4	dsl		Brewster N-4	450	5,000
	6	dsl		Cabot/Franks 147-A	450	5,000
Scott Jerry Drlg	1	dsl	350	Brewster N-4	350	5,500
Sloan Drlg	12	dsl	370	Brewster N-4	475	6,500
PUSHMATAHA						
Loffland Bros	227	dsl	2200	M-CSCO U-914-A	2500	22,000
ROGER MILLS						
Baker & Taylor Drlg	11	dsl	1140	EMSCO GCA-500	1140	12,000
	6	dsl	1400	M-CSCO U-40	1400	20,000
Bonray Drlg	2	dsl	1650	OILWELL 860	1650	20,000
Drillers	25	dsl	1000	Brewster N-75	1000	14,000
	29	dsl	1200	Ideco 700-E	1000	14,000
Helmerich & Payne Intl Drlg	78	scr	2000	National 11-0UE	1500	20,000
	89	dsl-elec	1500	National 110-UE	2000	20,000
Honeymon Drlg	11	dsl	1000	Gar-Den 800-M	1000	16,000
	12	dsl	1000	Gar-Den 800-M	1000	16,000
	16	dsl	1100	OILWELL 96	3000	18,000
Loffland Bros	123	gas	1975	National 120	2200	26,000
	311	dsl	2250	Gar-Den 1500	2500	24,000
Mercury Drlg	3	dsl	1000	OILWELL 96	2010	22,000
	4	dsl	750	EMSCO Unit U-15	980	12,000
Moran Bros	31	dsl-elec	2900	Ideco 2500-elec	2500	25,000
	34	dsl	1700	OILWELL 760	1200	15,000
	4	dsl-elec	1400	EMSCO A-800-WE	1000	15,000
	67	dsl	1700	EMSCO DIII	1000	15,000
Moran Drlg	38	dsl-elec	3200	M-CSCO C-2	2000	25,000
Moran E W Drlg	10	dsl	2700	OILWELL 96	2800	25,000
	25	dsl-elec	3200	Gar-Den 3000-E	3000	35,000
	28	dsl-elec	3200	Gar-Den 3000-E	3000	35,000
N & C Drlg	5	dsl	3200	EMSCO C-3 Type II	3000	30,000
Nicor Drlg	31	dsl-elec	2000	M-CSCO U-914-EC	1400	18,000
Noble Drlg	N-87	dsl	1200	National 80-B	1200	15,000
Parker Drlg	192	gas	1400	OIME 1000	1400	16,000
	43	gas	1500	OILWELL 96	1500	20,000
	47	gas	1500	OIME 1500-P	1500	20,000
	54	gas	2000	National 130	2000	25,000
	71	gas	1500	National 125	1500	20,000
Petra Drlg	25	dsl	1700	Ideco H7-11	1000	15,000
Resource Drlg	7	dsl	1560	National 80-B	1835	14,000
Robinson Bros Drlg	12	dsl	800	Gar-Den 700	1000	12,000
Rowan Drlg US	31	dsl	3200	National 1625	3300	30,000
Search Drlg	4	dsl-elec	2700	Gar-Den 1500-E	3000	24,000
Sharp Drlg	39	dsl	2970	OILWELL M-2000	2742	30,000
	40	dsl	2150	OILWELL 96	215	18,000
	52	dsl	1600	Bethlehem M-810	1836	19,000
Smart Drlg	4	dsl	1000	OILWELL 76	1400	16,000
TRG Drlg	11	dsl-elec	2000	Gar-Den 1100-E	2400	18,000
	131	dsl	2200	Gar-Den 1500-E	2400	22,000
	17	dsl-elec	2200	Gar-Den 1500-E	2400	22,000
Tierra Drlg	20	dsl-elec	800	BDW-800	800	14,000
Triad Drlg	7	dsl		Gar-Den 800	1100	15,000
URC Drlg	2	dsl	1100	National 100	1100	15,000
Unit Drlg & Expl	15	dsl	1300	M-CSCO 914-C	1850	20,000
	21	dsl	1000	Gar-Den 700	960	14,000
Wilson Bros Drlg	17	dsl	2600	National 110	2700	20,000
Zenith Drlg	5	dsl	1100	EMSCO M-58	1100	15,000
	9	dsl	1200	Gar-Den 800	1200	17,000
SEMINOLE						
Baulch Drlg	1	dsl	350	Brewster N-4	275	4,800
Rockwell Drlg	18	dsl	670	Unit U-34	450	5,000
	24	dsl	450	Mac-300	450	5,000
Scott Jerry Drlg	2	dsl	420	Unit U-34	430	6,500
	5	dsl	375	Bethlehem S-45	375	6,000
	7	dsl	350	Wilson Giant	350	7,000
Sloan Drlg	10	dsl	370	M-CSCO U-34	475	6,500
STEPHENS						
Ardmore Drlg	3	gas	1350	Ideco M-10000	1350	12,500
Cliffs Drlg	42	dsl	1300	National 1320-UE	1300	25,000
Gay Drlg Contractors	1	gas	80	2500 Series Wichtex	80	2,800
Magic Circle Drlg	16	gas	1300	Bethlehem M-810	1300	16,000
Nicor Drlg	32	dsl-elec	2700	M-CSCO 1220-E	2000	25,000/5"
Ratliff Drlg	8	gas-btne	1020	National 50-A	1020	10,000
Smart Drlg	1	dsl-mech	500	M-CSCO Unit U-15	950	13,000
Thomas Drlg	10	dsl	500	Wilson Super Giant	500	10,500
	11	dsl	300	Wichtex R-6	300	5,500
	6	gas	500	National 50-A	600	10,500
Vi-Roi Drlg	2	dsl	120	Howard-Turner 100	210	2,500
STEVENS						
Loffland Bros	104	dsl-elec	3300	EMSCO 3000	3300	35,000
TEXAS						
Gabbert-Jones	12	dsl	500	M-CSCO U-15	500	6,000
Lohmann-Johnson Drlg	11	dsl	325	National 50	600	6,000
	15	dsl	750	Brewster N-45	185	6,000
Mercury Drlg	11	dsl	750	EMSCO U-15	900	9,000
Service Drlg (OK)	8	dsl	836	Unit R-U34	636	10,000
	9	dsl	800	Unit R-U34	1000	10,000
	8	dsl	500	M-CSCO U-15	800	8,500

OKLAHOMA (Cont'd)

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
TEXAS (Contd)						
Zenith Drlg	6	dsl	600	EMSCO GB-350	600	8,500
TULSA						
Baker Oil & Drlg	2	dsl	150	Gar-Den 2000	150	2,000
Hemphill Corp	T-4	dsl	115	Ingersol-Rand Hydraulic	750	4,000
WASHITA						
Act Drlg	1	dsl	1750	Gar-Den 6-D 800	1000	16,000
Big Chief Drlg	37	gas	1350	EMSCO J-1250	1350	16,000
Helmerich & Payne Intl Drlg	48	dsl	1820	National 110	1820	22,000
	55	gas	1555	National 55	1100	16,500
	76	dsl	1650	OILWELL 760	1650	16,500
	80	scr	2200	National 110-UE	1500	20,000
	82	scr	2800	OILWELL E-2000	2000	26,000
	85	scr	850	OILWELL 760-E	1100	
Honeymon Drlg	15	dsl	750	BDW-800	1000	14,000
Loffland Bros	102	dsl-elec	3300	M-CSCO U-1220-EBD	3300	30,000
	196	dsl-elec	3300	M-CSCO U-1220	2200	28,000
	218	dsl-elec	3300	M-CSCO U-1220-E	2200	28,000
	222	dsl-elec	3300	M-CSCO U-1220-B	2200	28,000
	244	dsl-elec	2500	M-CSCO U-1220-E	2200	28,000
	32	dsl-elec	4000	EMSCO CE-3000	3300	35,000
	327	dsl	2250	Gar-Den 1500	2500	24,000
	70	dsl-elec	3200	M-CSCO U-1220-EB	2000	28,000
Mercury Drlg	9	dsl	1350	Gar-Den 1500	2800	25,000
Moran E W Drlg	5	dsl	1850	Wilson 120	1100	18,000
	7	dsl	1200	Gar-Den 700	800	12,500
	9	dsl	1900	Ideco 1050-PR	1350	18,000
Murco Drlg	50	scr	2200	OILWELL 860-E	2000	18,000
Noble Drlg	GD-1	dsl	3135	Gar-Den 1500	3135	22,000
	GD-2	dsl	3135	Gar-Den 2100	3135	25,000
	OW-22	dsl-elec	3300	OILWELL E-2000	3300	25,000
Parker Drlg	59	gas	1650	OIME 1500-P	1650	20,000
Project 5 Drlg	11	dsl-elec		S-L-5	1155	12,000
	14	dsl-elec		OILWELL E-2000	2000	25,000
Quarles Drlg	8	dsl	2000	OIME SD-7E	1000	22,000
Ratliff Drlg	17	dsl	700	National 50-A	700	12,000
Rowan Drlg US	5	dsl	3200	National 1625-M	3000	35,000
	9	dsl-elec	2600	National 1625-DE	2000	25,000
Sandia Drlg	3	dsl	3000	EMSCO D-3	3000	18,000
	4	dsl	4000	EMSCO C-1	4000	22,000
Smart Drlg	11	dsl	1000	National 100	1500	18,000
TRG Drlg	12	dsl-elec	1500	Gar-Den 800-E	1800	15,000
	132	dsl	3000	Gar-Den 3000-E	3000	30,000
	19	dsl-elec	2200	Gar-Den 1500-E	2400	22,000
	23	dsl	1400	National 80-B	1305	14,500
Tri-Service Drlg	7	dsl	2475	National 110-M	2475	18,000
Trigg Drlg	3	dsl	1200	National 100	1600	14,000
Unit Drlg & Expl	12	dsl	1350	Gar-Den 1500	2000	25,000
WOODS						
Lohmann-Johnson Drlg	5	dsl	300	National 50	440	4,500
Oliver E L Drlg	3	dsl	340	National T-12	250	5,000/4"
Rine Drlg	8	dsl	700	Brewster N-55	700	8,500
Thomas Drlg	2	dsl	300	National T-32	300	7,500
WOODWARD						
Drillers	1	dsl-hydra	200	Automated H-2000	200	12,000
FWA Drlg	9	dsl	1000	Wilson Giant	800	10,750
Hickman Drlg	2	dsl	1150	BDW-650	800	12,000
	3	dsl	1200	BDW-650	800	12,000
S & T Drlg Northern	1	dsl	1100	National 55	1100	11,500
Sage Drlg	3	dsl	400	Ideco H-40	400	8,500
Trend Drlg	4	dsl	900	M-CSCO Unit U-36-A	900	13,000
Triad Drlg	2	dsl		Brewster N-45	550	9,000
Unit Drlg & Expl	3	dsl	500	National 50-A	960	10,000

OREGON

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
CLATSOP						
Taylor Drlg	4	dsl	750	National 50	750	9,000
	5	prop	350	M-CSCO U-34	225	4,000

PENNSYLVANIA

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
UNDESIGNATED						
International Petr Serv	11	dsl	1000	Wilson 120	1650	18,000
CLEARFIELD						
Faiman Drlg	11	dsl	400	Ideco H-44	500	8,000
	14	dsl	400	Brewster	350	7,500
	6	dsl	350	Ideco H-44	550	8,000
CRAWFORD						
Delta Drlg	67	dsl		Spencer 7000	480	9,000
	77	dsl	250	Ideco H-35-KD	291	6,000
	78	dsl	250	Ideco H-35-KD	291	6,000
	79	dsl	255	Ideco H-35-KD	291	6,000
	92	dsl	255	Ideco H-35-KD	291	6,000

PENNSYLVANIA(Cont'd)

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
ERIE						
International Petr Serv	4	dsl	475	Wilson 42	475	7,500
	5	dsl	475	Wilson 42	475	7,500
Union Drlg	7	dsl		Cabot/Franks 500	425	6,500
FOREST						
Caster Well Drlg	1	dsl		Jaswell	150	2,400
	2	dsl		Jaswell		3,500
INDIANA						
Faiman Drlg	10	dsl	400	Wilson Mogul 42	350	5,000
	5	dsl	400	Cardwell	350	4,000
	9	dsl	400	Ideco H-44	500	8,000
Union Drlg	12	dsl		Cabot/Franks 500	425	6,500
JEFFERSON						
Faiman Drlg	12	dsl	400	Ideco	250	5,000
POTTER						
Faiman Drlg	7	dsl	350	Ideco H-44	550	8,000
RANDOLPH						
Union Drlg	11	dsl		Spencer 5000	350	5,000
WARREN						
International Petr Serv	10	dsl	600	Wilson Mogul 42	475	7,500
	12	dsl	475	Challenger Model 320	360	4,000
	8	dsl	600	Wilson Mogul 42	475	7,500
	9	dsl	475	Challenger Model 320-HD	360	4,500
WASHINGTON						
Faiman Drlg	8	dsl	350	Ideco H-44	550	8,000

SOUTH DAKOTA

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
CORSON						
Bomac Drlg	32	dsl	760	Ideco H-40	760	8,500
FALL RIVER						
Western Well Drlg	1	dsl	350	Midway 2000	350	2,500
HARDING						
Cardinal Drlg	11	dsl	864	EMSCO GA-500	864	10,500
Elenburg Expl	3	dsl	420	Walker-Neer CC-2000	230	2,500
Noble Drlg	N-57	dsl	800	National 55	800	12,000

TENNESSEE

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
UNDESIGNATED						
B-J	1	dsl	525	Ingersoll	525	3,000
	2	dsl	525	Ingersoll	525	3,000
	3	dsl	400	Drill-Tec	400	2,500
CUMBERLAND						
Miller Contract Drlg	17	dsl	400	Spencer	400	3,000
FENTRESS						
Miller Contract Drlg	8	dsl	400	Ingersoll	400	3,000
Norman Drlg	2	dsl	750	Ingersoll	450	2,500
MORGAN						
Miller Contract Drlg	16	dsl	525	Ingersoll	525	3,000
OVERTON						
Miller Contract Drlg	10	dsl	525	Ingersoll	525	3,000
	2	dsl	400	Ingersoll	400	3,000
Norman Drlg	1	dsl	750	Ingersoll	450	2,500
SCOTT						
Miller Contract Drlg	9	dsl	525	Ingersoll	525	3,000

TEXAS

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
UNDESIGNATED						
Adeco Drlg & Engr	18	dsl	700	OIME Helihoist 500-C	1370	23,000
Bawden Peter Drlg	15	dsl	1550	Unit U-40-D	800	12,000
	19	dsl	1200	OILWELL 76	700	12,000
	26	dsl	1450	OILWELL 76	700	12,000
	30	dsl	1850	EMSCO D-3 1000	1000	15,000
	31	dsl	2300	OILWELL 96	1500	205
	7	dsl	1200	National 55	700	11,500
Brahaney Drlg	3	gas	900	National 75-CA	900	12,000
Burns L D Drlg	4	dsl	888	Wilson 75	600	12,000
Burris Drlg	115	dsl	750	Superior 700	500	10,000
	116	dsl	750	Superior 700	500	10,000
Burro Drlg	1	dsl	500	Wilson Mogul 42	500	9,000
C & H Drlg	2	dsl		Brewster N-4	375	6,000
	4	dsl		Ideco H-38-D	350	5,000
	7	dsl		Wichtex	350	5,000
Cherokee Drlg & Serv	6	dsl		BDW 450	670	7,000
	7	dsl	700	BDW 650	900	11,000
Cinco Drlg	7	dsl	960	M-CSCO U-34	425	6,500
Dual Drlg	30	dsl	2000	OILWELL 500	500	7,000
	31	dsl	2000	OILWELL 500	500	7,000
	32	dsl	2800	OILWELL 840	1500	11,000
	33	dsl	840	OILWELL 840	1500	22,000
	34	dsl	2000	EMSCO D-3	1000	16,000
	35	dsl	2000	EMSCO D-3	1000	16,000
	36	dsl	2000	OILWELL 760	1000	16,000

TEXAS (Cont'd)

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
UNDESIGNATED (Contd)						
F-W Drlg	10	dsl	1000	Ideco H-1200	1000	16,000
Flournoy Drlg	10		1250	Brewster N-46	820	12,500
FOREX Neptune	46	dsl-elec	3200	Gar-Den 1500-E	2000	21,700
	47	dsl-elec	3200	Gar-Den 1100-E	1500	18,000
	48	dsl-elec	3200	Gar-Den 1100-E	1500	18,000
Gopher Drlg	7	dsl	150	Cabot/Franks	100	4,000
Guthrie McLaren Drlg	3	dsl	680	National 50-CA	600	10,000
Ironwood Drlg	1	dsl	750	EMSCO GC-350	750	9,000
	2	dsl	1000	M-CSCO U-36-A	820	10,500
	3	dsl	700	National 50-CA	820	10,000
J 3 Drlg	1	dsl	1300	Unit U-36-A	950	13,500
	2	dsl	1600	Unit U-36-A	950	13,500
	3	dsl	1600	Unit U-34-B	700	10,000
	4	dsl	1100	Unit U-34-B	700	10,000
	5	dsl	2740	Unit U-914	3000	18,000
Jones Drlg Corp	3	dsl	300	Houston Portable	350	2,000
Landford Drlg	6	dsl	300	Brewster	200	1,500
	9	dsl	300	Brewster	200	2,000
Louise Drlg	1	dsl	2684	Ideco H-40	1006	10,000
Lowe Drlg	2	dsl	475	M-CSCO U-34	475	6,000
	6	dsl	475	M-CSCO U-34	475	6,000
Marlin Drlg	8	dsl-elec	1600	National 80-B	1500	12,000
Marlin West	13	dsl-elec	2000	National 110		14,000
McDonald & Son Drlg	2000	dsl		Failing	300	1,500
Merit Drlg	10	dsl-scr		OILWELL 760-E	1000	15,000
Murphy Peter Drlg	1	dsl	800	Cardwell C-Horse	300	5,500
O'Connor & Young Drlg	104	dsl-elec	1600	National 610-E	750	12,000
	152	dsl-elec	2000		1000	14,000
	153	dsl-elec	2000	Gar-Den 800-E	1000	15,000
	301	dsl-elec	3200	Gar-Den 3000-E	3000	25,000
O'Neal Drlg	14	dsl	15000	National 80-B	1500	15,000
	15	dsl-elec	2000	Gar-Den 800	1500	18,000
Pearl Expl	1	dsl	800	Model 65	400	7,000
Pool Well Serv	100	dsl	300	Wilson Mogul 42 Double Drum	450	5,500
	50	dsl	379	Cabot/Franks 500	500	5,500
Riley Drlg	2	dsl	300	National	300	4,500
	3	dsl	300	M-CSCO U-34	225	4,000
	4	dsl	300	Cabot/Franks	300	4,500
Rio Colorado Drlg	131	dsl	1300	Ideco H-30	500	9,500
	133	dsl	1200	Ideco H-40	500	9,500
	135	dsl	1300	Ideco H-40-SP	500	9,500
	136	dsl	1300	Ideco H-40-SP	500	9,500
	138	dsl	2000	National BR-800	1200	16,000
	139	dsl	1100	National T-45	500	10,000
	140	dsl	1100	National T-45	500	10,000
	141	dsl	1100	National T-45	500	10,000
	142	dsl	1200	National 100	500	10,000
	143	dsl	1100	National T-45	500	10,000
Santa Fe Drlg	SFW-10	dsl-elec	2000	EMSCO Electrohoist H-11	1800	24,000
	SFW-12	dsl-elec	2300	EMSCO A-1100-E	1800	20,000
	SFW-14	dsl-elec	3200	EMSCO C-3111	3000	30,000
	SFW-15	dsl-elec	1600	EMSCO C-111	20000	30,000
	SFW-16	dsl-elec	1300	EMSCO C-11	2000	25,000
	SFW-2	gas	1700	Bethlehem M-1013	2118	22,000
	SFW-3	dsl-elec	2900	EMSCO A-1500-E	2000	30,000
	SFW-4	dsl-elec	2600	EMSCO C-3111	3000	30,000
	SFW-5	gas	2200	Bethlehem B-1013	2118	22,000
	SFW-6	dsl-elec	2300	EMSCO C-3111	3000	30,000
	SFW-7	dsl-elec	2600	EMSCO C-3111	3000	30,000
	SFW-8	dsl-elec	2600	EMSCO A-1500-E	2000	30,000
Santa Fe Drlg Western	7	dsl-elec	2600	EMSCO C-111	2700	30,000
Shelby Drlg	55	dsl-elec	1700	Gar-Den 1100-E	2000	20,000
Sledge D Drlg	3	gas	650	National 50-A	850	12,500
	4	dsl	600	U-15	800	10,000
Thunderbolt Drlg	53	dsl	1200	Wilson 75	950	11,000
Torreon Drlg	R-3	dsl	300	Ideco H-30	250	6,500
Unit Drlg & Expl	6	dsl	950	Unit U-15	882	11,000
ANDERSON						
Burris Drlg	106	dsl	1000	National 50-CA	1000	10,500
Cape Drlg	2	dsl	1000	Brewster TR-7W	600	8,500
Gibson Drlg	10	dsl	1200	EMSCO D-2	1200	12,000
Globe Drlg	3	dsl	800	M-CSCO U-15	800	12,000
ANDREWS						
Ard Drlg	7	dsl	1200	M-CSCO U-40	1200	14,000
BBL Drlg	1	dsl	500	Wilson Mogul 42	760	8,000
Brown Tom	2	dsl	350	National T-16	380	4,500
	7	dsl	700	National 75-CA	700	13,000
Cliffs Drlg	28	dsl	1300	National 1320	1300	25,000
	40	dsl	1300	National 1320-UE	1300	25,000
Hillin Drlg	8	dsl	500	Wilson 42 Mogul	400	5,000
Kenai Drlg of Texas	11	dsl	400	National T-20	400	6,500
	19	dsl	700	EMSCO GA-500	800	11,000/4"
	19	dsl	825	EMSCO GA-500	800	11,000
Norwood A N	2	dsl	700	Brewster N-4	450	6,000
Rod Ric	10	dsl	670	EMSCO G-500	600	8,500/4"
	3	dsl	670	Brewster N-45-M	600	9,000/4"
	6	dsl	450	Bethlehem S-45-E	450	7,000/4"
	8	dsl	670	Brewster N-45	600	8,000/4"
Sharp Drlg	47	dsl	1200	Bethlehem M-58	988	13,500
Sterling Drlg (TX)	17	dsl	1500	Brewster N-75	1230	14,000
	2	dsl	1500	National 610	1150	13,000
Tahoe Drlg	3	dsl	1600	EMSCO D-2	1200	13,500

TEXAS (Cont'd)

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
ANDREWS (Contd)						
Tri-Service Drlg	5	gas-btne	1800	OILWELL 760	1400	16,000
Willbaos Drlg	8	dsl	800	Unit U-15	800	11,000
ARCHER						
Lin-Mour Drlg	33	gas	550	Wilson Giant	550	9,500
Wes-Mor Drlg	11	dsl		Wilson Roadair		6,000
AUSTIN						
Big 6 Drlg	3	dsl	750	Cabot/Franks	600	11,000
Cactus Drlg Corp	29	dsl	1500	National 80-B	1770	16,000
Drillers	15	dsl	1000	OILWELL 66	800	12,000
Nicklos Drlg	77	dsl-elec	1600	EMSCO C-1-II	1530	16,000
Penrod Drlg	22	dsl	2600	National 1320-N	1950	25,000
Richards-Armstrong	6	dsl	2500	OILWELL 860	2400	18,000
Thunderbolt Drlg	52	dsl	1700	National 55	1845	13,000
BASTROP						
Sterling Drlg (TX)	18	dsl	1250	National 610	1100	13,000
BAYLOR						
Bearden Jack E Drlg	4	dsl	600	Wilson Mogul	400	6,500/4"
BEE						
Atco Drlg Southern	55	dsl	1800	National 80-UE	1800	15,000
BDK Drlg	4	dsl	1095	Brewster N-7	870	11,500
Padre Drlg	4	dsl	500	Brewster H-4210	400	7,500
Robinson Bros Drlg	6	dsl	2200	National	1600	18,000
BORDEN						
Kenai Drlg of Texas	16	dsl	700	EMSCO GA-500	780	11,000/4"
McCutchen J W Drlg	3	dsl	900	Wilson Atlas Roadair	900	10,000
Robinson Drlg of Texas	3	dsl	750	M-CSCO U-15	900	10,000
Willbaos Drlg	2	gas	1150	Wilson Giant	840	10,000
BRAZORIA						
Atco Drlg Southern	52	dsl		M-CSCO		12,000
Big 6 Drlg	2	dsl	800	Cabot/Franks	600	10,000
	8	dsl-elec	1600	National 610	900	12,000
Bilbo Drlg	4	dsl	800	Cabot/Franks 900	900	11,500
Frio Drlg	4	dsl	1100	National N-55	1100	12,000
Nicklos Drlg	23	dsl	1850	National 110	1755	18,000
Richards Drlg	2	dsl	1500	Brewster N-75	1200	12,500
Welsh Drlg & Serv	11	dsl	1750	OILWELL 76	1605	12,500
	14	gas	1750	National 110-M	2550	16,000
BRAZOS						
Blocker Drlg	15	dsl	845	Cabot/Franks Series 900	950	10,000
	2	dsl	815	Cabot/Franks Series 750	650	7,500
	4	dsl	1200	National 55	1530	12,000
Butler Drlg	6	dsl	1100	Gar-Den 500	600	10,500
Culver Drlg	15	dsl-elec	1000	National 110	2000	16,000
Matagorda Drlg	14	dsl	2600	National 110	2000	18,000
Matagorda Marine Drlg	10	dsl	1600	EMSCO D-2	1000	12,000
Merit Drlg	9	dsl-scr	1200	OILWELL 660-E	700	11,000
BROOKS						
Atco Drlg Southern	57	dsl	1200	National 610-UE	1800	12,000
Blocker Drlg	9	dsl	1250	Ideco Hydrair H-1000	950	10,500
Delta Drlg	95	dsl-elec	2900	EMSCO C-I	3456	20,000
Dixilyn-Field Drlg	8	dsl	1950	National 110	1638	16,000
Flournoy Drlg	2	dsl	800	EMSCO C-50	480	9,000/4"
	7	dsl	1775	OILWELL 76	1176	13,500
PRC Drlg	2	dsl	880	Unit 34	460	7,500/4"
Southland Drlg	8	dsl	700	EMSCO GB-350	700	8,000
Willis Drlg	1	dsl	1000	Bethlehem B-Line MC-450	1000	12,000
	5	dsl	800	M-CSCO U-15	800	10,000
BURLESON						
Atco Drlg Southern	21	dsl	1080	Gar-Den 500	580	9,500
BDK Drlg	6	dsl	1000	Brewster 4610	950	10,000
Bilbo Drlg	3	dsl	900	Cardwell KB-250	600	10,000
Blocker Drlg	3	dsl	1475	Cabot/Franks Expl Rocket III	950	12,000
	5	dsl	1300	Cabot/Franks Expl Rocket 900	950	10,000
	7	dsl	950	Cabot/Franks Series 900	600	10,500
Brown Tom	26	dsl	700	Gar-Den 500	700	12,000
Cinco Drlg	6	dsl	1015	M-CSCO U-15	780	11,000
Crawford Drlg	7	dsl	600	M-CSCO U-15	800	10,000
DB Drlg	12	dsl	2000	National 100	1500	13,000
	7	dsl	1380	National 50-A	980	10,000
Dual Drlg	1	dsl	1500	Wilson 75-P	900	12,500
	14	dsl	2100	Wilson Giant	900	12,000
	8	dsl	1500	Wilson 75	750	9,500
F-W Drlg	14	dsl	800	Ideco	750	11,000
	8	dsl	800	Brewster N-42	750	11,000
	9	dsl	800	Ideco H-725	750	11,000
France Drlg	1	dsl	1600	Gar-Den 700	900	13,000
Frio Drlg	1	dsl	800	EMSCO 350	550	9,500
Hondo Drlg	8	dsl	1100	Brewster N-55	800	11,000
Loffland Bros	77	dsl	1450	National 100	1575	17,000
MGF Drlg-Houston	6	dsl	750	National T-32	750	8,500
	7	dsl	850	Brewster N-55	850	11,000
	8	dsl	800	Unit U-15	800	10,000
MGF Drlg-Midland	6	dsl	750	National T-32	750	9,000

TEXAS (Cont'd)

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
BURLESON (Contd)						
MGF Drlg-Midland	7	dsl	850	Brewster N-55	850	12,000
New & Hughes Drlg	6	dsl	450	Bethlehem C-50	600	11,000
Pernie Bailey Drlg	21	dsl	500	EMSCO J-750	800	11,000
Rainbow Drlg	3	dsl	1600	Cabot/Franks 900	900	11,000
	4	dsl	1600	Cabot/Franks 1200	1200	14,000
Southland Drlg	7	dsl	650	Brewster N-55	600	10,000
Sterling Drlg (TX)	10	dsl	1400	Brewster N-75	1100	13,000
	12	dsl	1500	National 610	1100	13,000
	19	dsl	1110	Brewster N-46	770	11,000
	7	dsl	850	National 50-A	900	12,000
Texland Drlg	5	dsl	1290	Unit U-15	950	10,000
CALDWELL						
Economy Drlg	2	dsl	700	Bethlehem	800	8,000
McConnell Drlg	1	dsl	300	National T-12	200	3,000
Nixon Drlg	1	dsl	3306	Cardwell Cat-D	3306	4,000
	2	dsl	3306	Cardwell	3306	4,000
CALHOUN						
Frio Drlg	3	dsl	900	Brewster N-55	900	10,500
Resource Drlg	17	dsl	1560	National 80-B	1835	14,000
CALLAHAN						
Tierra Drlg	1	dsl	650	Bethlehem S-45	650	7,000
CAMERON						
Willis Drlg	3	dsl	1000	Brewster N-75	1000	12,000
CAMP						
Burris Drlg	105	dsl	750	M-CSCO 36-A	1000	13,500
CASS						
Butler-Johnson	6	dsl	2000	Brewster N-85	1900	15,000
Justiss Oil	25	dsl	250	EMSCO GC-350	450	12,000
Noble Drlg	N-58	dsl	800	National 55	800	12,000
CHAMBERS						
Matagorda Marine Drlg	12	dsl	2000	National 80-B	1500	15,000
Resource Drlg	RD-21	dsl	2330	National 110	2740	18,000
CHEROKEE						
Burris Drlg	110	dsl	1200	Gar-Den 700	750	14,000
Delta Drlg	64	dsl	1200	EMSCO D-2	784	10,500
Gibson Drlg	11	dsl	1200	EMSCO D-2	1200	12,000
H & S Drlg	2	dsl	1700	Brewster N-95	2145	14,000
Hinton W B Drlg	6	dsl	1600	National 8-B	1650	15,000
Rotary Drlg	2	dsl	850	Spencer 7000	700	10,600
	4	dsl	850	Spencer 7000	700	10,600/4"
Schlensker Drlg	20	dsl	1270	National 75-CA	1270	14,000
	6	gas	700	Unit U-15	800	10,000
CHILDRESS						
Bearden Jack E Drlg	2	dsl	1500	Wilson Giant Roadair	700	9,000
CLAY						
Lin-Mour Drlg	21	btne-gas	650	Unit 15	650	7,500
MND Drlg	54	dsl	600	M-CSCO U-15	600	9,000
	61	dsl	600	M-CSCO U-15	600	9,000
Min-Tex Drlg	31	dsl	500	Hyster Model A	550	10,000
COCHRAN						
Norton Drlg	2	dsl	450	Wilson Mogul 42	650	7,000
Sitton Drlg	1	dsl	450	Wilson 600	525	6,500
	2	dsl	650	Wilson 75-P	900	11,500
COKE						
Bandera Drlg	4	dsl	750	BDW 450-T	475	8,500
Cam Drlg	1	dsl	500	Bethlehem S-445-E	650	8,000
FWA Drlg	14	dsl	800	Wilson Mogul	600	7,000
GCO Drlg	8	dsl	1000	National 370	650	8,000
Megargei Drlg	2	dsl	750	Unit Double Jacknife U-15	750	7,000
Mesa Drlg	1	dsl	400	Ideco	400	7,000
COLEMAN						
Bandera Drlg	3	dsl	250	Brewster N-3	300	4,000
F-W Drlg	3	dsl	600	National T-12	450	5,000
Jones Drlg Corp	1	dsl	450	Brewster N-4	450	5,500
Tri-J Drlg	1	dsl	325	Wichtex R-5	250	3,000
COLORADO						
Doss	1	dsl	353	Cooper T-6	425	7,000
O'Connor & Young Drlg	203	dsl	2600	Brewster NE-95	1750	18,000
PRC Drlg	4	dsl	758	Cabot/Franks 900	900	10,000/4"
CONCHO						
Caraway Frank Drlg	3	dsl	750	Bethlehem S-50	375	6,000
COOKE						
Felderhoff Bros Drlg	1	gas	285	Wilson Mogul	185	5,200
	2	dsl	800	Wilson Giant	600	9,000
Guffey-Schlensker Drlg	2	dsl	600	Brewster N-45	700	8,000
COTTLE						
Bearden Jack E Drlg	5	dsl	1200	Wilson 75	750	9,500
CRANE						
Ard Drlg	4	dsl	900	M-CSCO U-15	900	12,000
Brown Tom	1	dsl	350	M-CSCO U-15-CA	500	6,000
	20	dsl	350	Ideco H-400	500	7,000
Hillin Drlg	6	dsl	500	Ideco H-25 Trailer Rig	360	5,000
John Drlg	8	gas	800	Brewster N-75	800	12,500

TEXAS (Cont'd)

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
CRANE (Contd)						
Kenai Drlg of Texas	32	dsl	600	EMSCO GA-500	800	11,000
Loffland Bros	26	dsl-elec	1700	M-CSCO U-36	1200	11,000
Rod Ric	2	dsl	450	Bethlehem S-45-E	450	7,000/4"
CROCKETT						
Brahaney Drlg	8	gas	1400	OILWELL	1400	17,000
Brushy Creek Drlg	8	dsl	250	Scharm 685	500	2,850
DB Drlg	5	dsl	675	Brewster N-4	540	7,000
Delta Drlg	73	dsl	500	Spencer 7000	440	9,000
	86	dsl	500	Spencer 7000	480	9,000
Tucker Drlg	6	dsl	750	Brewster N-75	750	12,000
Wes-Tex Drlg	10	dsl	300	Brewster N-4	500	8,000
	17	dsl	335	Unit U-34	500	8,000
	2	dsl	650	Bethlehem S-45-E	650	10,000
	6	dsl	650	Bethlehem S-60	700	10,000
	9	dsl	700	National 50-A	700	10,000
CROSBY						
Megargel Drlg	4	dsl	350	S-45-B Bethlehem Double Jacknife	275	5,370
CULBERSON						
Cactus Drlg (NM)	54	dsl	502	Bethlehem S-55	454	6,500
Cactus Drlg (TX)	54	dsl	520	Bethlehem S-55	454	6,500
Kenai Drlg of Texas	17	dsl	410	Brewster N-4	450	6,500/4"
	17	dsl	800	Brewster N-4	580	7,000
	20	dsl	500	EMSCO GB-250-T	400	6,500
	20	dsl	410	EMSCO GB-250	400	6,500/4"
Parker Drlg	88	gas-elec	2000	National 130	3000	25,000
CUSTER						
Baker & Taylor Drlg	14	dsl	1140	M-CSCO U-40	1140	18,000
DE WITT						
Atco Drlg Southern	9	dsl-elec		National 110		18,000
DAWSON						
Blocker Drlg	10	dsl	840	Ideco Hydrair H-37 ESC	430	7,500
Cactus Drlg (NM)	59	dsl	502	Brewster N-4	454	6,000
Cactus Drlg (TX)	59	dsl	520	Brewster N-4	454	6,000
Chico Drlg	3	dsl	1300	EMSCO D-2	1240	14,000
Hillin Drlg	5	dsl	1200	National H-1200	1200	15,000
Hondo Drlg	7	gas	1000	Brewster N-55	750	10,500
	9	dsl	1050	Brewster N-55	800	10,000
Robinson Drlg of Texas	6	dsl	950	Bethlehem M-58	1350	12,500
Sterling Drlg (TX)	9	dsl	1350	Brewster N-75	1100	14,000
Tahoe Drlg	1	dsl	900	National 50-CA	1250	11,500
Wes-Tex Drlg	3	dsl	700	National 50-A	700	10,000
	4	dsl	650	EMSCO G-500	650	1,000
DEWITT						
Buzzini Drlg	8	dsl	3600	OILWELL M-2000	2400	25,000
Southland Drlg	12	dsl	2300	M-CSCO 1500-A	2300	24,000
DICKENS						
Wes-Mor Drlg	8	gas-btne		M-CSCO U-15		6,500
DUVAL						
Helmerich & Payne Intl Drlg	37	dsl	3270	OILWELL M-2000	3270	22,000
Matagorda Marine Drlg	11	dsl	2600	National 110	2000	18,000
EASTLAND						
IX Drlg	2	dsl	476	EMSCO GA-250-T	476	6,000
J & W Drlg	1	dsl-gas	180	Hydril M-H	220	4,000
	2	gas	180	Ideco 150	180	3,500
Sweetwater Drlg	4	dsl	575	National T-20	475	6,500
Tierra Drlg	2	dsl	650	Bethlehem S-45	650	7,000
Wes-Mor Drlg	2	dsl		M-CSCO U-34		6,000
ECTOR						
Brown Tom	18	dsl	840	M-CSCO U-15-CA	840	10,000
Cactus Drlg (NM)	53	dsl	502	Bethlehem S-55	875	7,500
	58	dsl	446	Bethlehem S-45-E	454	6,500
	53	dsl	520	Bethlehem S-55	670	7,500
	53	dsl	520	Bethlehem S-45-E	454	6,500
Cherokee Drlg & Dev	2	dsl	1150	Wilson 75	900	1,100
Hillin Drlg	3	dsl	500	BDW 450-T	575	7,500
	9	dsl	600	Ideco H-40	600	7,000
John Drlg	10	dsl	800	OILWELL 66	800	10,000
Verna Corp	11	dsl	500	M-CSCO U-15		11,500
	12	dsl	500	M-CSCO U-15	600	11,500
	13		600	Brewster N-4	400	6,500
	14	dsl	500	Wilson Mogul 42	550	7,000
	15	dsl	600	M-CSCO	600	11,500
	16	dsl	600	Brewster N-14	450	6,500
	17	dsl	550	M-CSCO U-15	650	11,500
	18	dsl-elec	1000	National 1320-E	2000	22,000
	19	dsl	550	M-CSCO U-15	600	11,500
	20	dsl	1000	Verna Drlg	15000	13,000
	34	dsl	1000	EMSCO A-800	1200	15,000
ERATH						
Min-Tex Drlg	28	dsl	400	Cardwell L	500	5,200
FAYETTE						
Brown Tom	8	dsl	700	National 50-CA	700	10,000
Butler Drlg	3	dsl	1450	Brewster N-75	1100	12,500
	7	dsl	950	Brewster N-45	500	10,000

TEXAS (Cont'd)

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
FAYETTE (Contd)						
Cactus Drlg Corp	22	dsl	1650	National 100	2025	18,000
	7	dsl	1500	OILWELL 76	1770	14,000
Challenger Drlg	17	dsl	1900	Cabot/Franks 1000	1000	12,000
Cinco Drlg	1	dsl	900	M-CSCO U-15	780	11,000
Crawford Drlg	10	dsl	800	EMSCO GB-800	800	14,000
	11	dsl	600	National 50-A	800	11,000
	4	dsl	600	M-CSCO U-15	800	10,000
	5	dsl	600	M-CSCO U-15	800	10,000
	6		600	M-CSCO	800	10,000
Dixon Drlg	10	dsl	1300	Bethlehem S-60	500	10,000
Eagle Prod & Drlg Serv	4	dsl-elec	2000	OILWELL E-760	1000	16,000
FWA Drlg	24	dsl	1350	Wilson Mogul 42	800	11.000
Moran E W Drlg	19	dsl	1200	Wilson 75	900	10,500
New & Hughes Drlg	12	dsl	800	Wilson Giant	800	13,000
O'Connor & Young Drlg	103	dsl-elec	1000	National 370-E	500	10,000
Penrod Drlg	125	dsl	1000	National 80-B	1760	15,000
Richards Drlg	4	dsl	1400	OILWELL 66	1200	10,500
Rosamond Drlg	7	dsl	1450	Brewster N-10	1275	13,500
South Texas Drlg	6	dsl	500	Brewster N-46	800	10,000
Sterling Drlg (TX)	15	dsl	1400	Brewster N-75	1100	14,000
	16	dsl	1400	Brewster N-75	1230	14,000
	5	dsl	1230	National 50-CA	820	11,000
Tierra Drlg	17	dsl-elec	800	BDW-650	650	12,000
FISHER						
Bandera Drlg	6	dsl	600	Unit 34	360	6,500
Hack Drlg	3	dsl	350	Bethlehem S-45-E	350	7,000
Sojourner Drlg	1	dsl		M-CSCO U-15	550	7,000
	2	dsl		M-CSCO U-15	550	7,000
	5	dsl	250	M-CSCO U-15	550	7,000
Tri-J Drlg	3	dsl	500	Mayhew 3000	250	3,000
FOARD						
Bearden Jack E Drlg	7	dsl	600	Wilson Mogul	400	6,500/4"
Luke Grace Drlg	2	dsl	500	M-CSCO U-15	750	10,500
FORT BEND						
Drillers	10	dsl	1600	National 100-M	1600	18,000
Richards Operating	9	dsl-elec	3400	OILWELL E-3000	3000	30,000
FRANKLIN						
Cape Drlg	5	dsl	400	Walker-Neer Apache 950-40	425	6,000
Lester Dan Drlg	9	dsl		OILWELL Div US Steel	1500	16,000
FREESTONE						
Cliffs Drlg	29	dsl	1300	National 110	1300	20,000
Delta Drlg	5	dsl	2000	National 100	1560	16,000
Eagle Prod & Drlg Serv	5	dsl-elec	2000	OILWELL E-2000	2000	25,000
France Drlg	2	dsl	1700	OILWELL 760	1700	17,000
FWA Drlg	27	dsl	2000	Gar-Den 800-M	1350	15,000
Hinton W B Drlg	7	dsl	1600	National 80-B	1650	15,000
Maxwell Herring Drlg	17	dsl	2500	Bethlehem	2400	20,000
	18	dsl	3250	Gar-Den	2700	23,000
O'Connor & Young Drlg	151	dsl-elec	1000	Brewster NE-95	500	10,000
FRIO						
Bearden Jack E Drlg	6	dsl	1200	Wilson 75	750	9,500
Cactus Drlg (NM)	55	dsl	502	Ideco H-35	670	6,500
	61	dsl	502	National T-20	460	6,000
	62	dsl	502	Ideco H-35	454	6,500
Cactus Drlg (TX)	55	dsl	520	Ideco H-35	670	6,500
	61	dsl	520	National T-20	460	6,000
	62	dsl	520	Ideco H-35	454	6,500
Dixon Drlg	11	dsl	600	National T-20	300	7,500
South Texas Drlg	1	dsl	500	Brewster N-45	500	8,000
FT BEND						
Butler Drlg	9	dsl	1250	Gar-Den 500	600	10,500
Helmerich & Payne Intl Drlg	83	scr	2000	OILWELL E-2000	1400	30,000
Southland Drlg	6	dsl	600	Howard-Turner 1887-600-TD	600	8,500
GAINES						
Brown Tom	3	gas	700	National 50	700	10,500
Cactus Drlg (NM)	52	dsl	550	Ideco H-35	454	6,500
	60	dsl	502	Bethlehem S-45-E	454	6,500
	63	dsl	502	Brewster N-4	454	6,500
Cactus Drlg (TX)	18	dsl	1200	National T-32	1000	8,500
	52	dsl	520	Ideco H-35	454	6,500
	60	dsl	520	Bethlehem S-45-E	454	6,500
Cactus Drlg Corp	18	dsl	920	National T-32	626	8,000
Moranco	9	dsl	750	Brewster N-55	750	11,000
Rod Ric	7	dsl	770	Wagner-Morehouse Helihoist	900	10,000/4"
	9	dsl	750	Ideco H-35	600	8,000
Tri-Service Drlg	3	gas-btne	750	OILWELL 76	750	13,000
GALVESTON						
Butler Drlg	10	dsl-elec	2000	Brewster W-95	1750	18,000
	4	gas	1600	Gar-Den 1100	1600	18,000
[illegible]C Mallard Well	19	dsl	1300	Wilson 90	800	14,500
Inland Well Serv	8	dsl	400	Ideco H-35	350	6,000
Southland Drlg	3	dsl	1300	Brewster N-75	750	11,000
GARZA						
Wes-Tex Drlg	11	dsl	450	Bethlehem S-55	700	10,000
	5	dsl	550	National 50-A	700	10,000
GLASSCOCK						
Cactus Drlg Corp	14	dsl	850	OILWELL 66	942	11,000
Delta Drlg	98	dsl	1500	Wilson Giant Roadair	784	12,500
Tri-Service Drlg	4	gas-btne	700	OILWELL 66	700	10,000
Tucker Drlg	1	dsl	750	Brewster N-55	750	10,000
Willbaos Drlg	3	dsl	800	Unit U-15	800	11,000
GOLIAD						
Blocker Drlg	8	dsl	1900	Cabot/Franks Expl III 1200	1165	14,000
Corpus Christi Drlg	4	dsl	300	Wilson Super 38	250	5,450/3½"
Loffland Bros	322	dsl	1800	Gar-Den 800	2100	17,000
Rhodes & Hicks Drlg	6	dsl	600	Cabot/Franks 750	700	9,000/4"
GONZALES						
BDK Drlg	8	dsl	1000	Brewster 4610	750	10,000
Brown Tom	10	dsl	700	M-CSCO U-15-CA	700	10,500
	6	dsl	700	National 75-CA	700	12,000
Cactus Drlg Corp	23	dsl	1700	National 100	1894	17,000
Cinco Drlg	2	dsl	890	National T-32	850	8,000
Crawford Drlg	2	dsl	600	M-CSCO U-15	800	10,000
Culver Drlg	12	dsl	1000	National 55	1000	11,000
Hondo Drlg	11	dsl	950	M-CSCO U-15	700	10,500
N & C Drlg	1	dsl	1800	Brewster N-46	13000	13,000
	3	dsl	1800	Brewster N-46	900	13,000
Republic Drlg & Serv	6	dsl	800	Ideco 525	700	10,000
Resource Drlg	RD-20	dsl	1040	National 610	1220	12,000
	RD-23	dsl	1040	National 610	1220	12,000
South Texas Drlg	5	dsl	500	Brewster N-45	500	6,000
Tierra Drlg	10	dsl	650	BDW-650	700	12,000
	11	dsl	650	BDW-650	700	12,000
GRAY						
Service Drlg (TX)	11	dsl	420	M-CSCO U-34	420	6,000
GRAYSON						
Big Chief Drlg	30	gas	1515	Ideco 1050	1515	15,000
Guffey-Schlensker Drlg	1	dsl	700	Unit U-36-A	933	11,000
Moran E W Drlg	14	dsl	1600	Wilson 150	1000	15,000
	15	dsl	900	Bethlehem S-55	750	10,000
	21	dsl	1600	Wilson 120	1000	15,000
	3	dsl	1100	Wilson Giant	800	12,000
Nicor Drlg	63	dsl	2650	OILWELL 96	1500	18,000
TRG Drlg	5	dsl	1400	National 75	1305	13,000
Viersen & Cochran Drlg	18	dsl	1000	National		
GREGG						
Justiss Oil	27	dsl	700	Bethlehem MC-450	900	12,000
Maxwell Herring Drlg	15	dsl	1200	Spencer	400	10,000
Pool Well Serv	102	dsl	350	Wilson Mogul 42 Double Drum	500	5,500
	122	dsl	375	M-CSCO U-34	350	5,500
	188	dsl	1000	Wilson 42	500	5,500
	229	dsl	379	Cabot/Franks 750	750	5,500
	61	dsl	450	Pool	500	5,500
United Drlg Co of Tyler	8	dsl	1600	Bethlehem M-58	1200	13,000
GRIMES						
Brown Tom	9	dsl	1050	National 75-CA	1050	12,500
Nicklos Drlg	76	dsl-elec	2600	National 1320-UE	1800	25,000
Pernie Bailey Drlg	1	dsl	1500	Brewster N-75	850	12,000
T-L Drlg	2	dsl	2000	Brewster N-75	1200	14,000
HANSFORD						
Unit Drlg & Expl	7	dsl	500	Unit U-15	960	10,000
Zenith Drlg	8	dsl	600	EMSCO GB-350	600	8,500
HARDEMAN						
Bearden Jack E Drlg	1	dsl	1200	Wilson Mogul 42	750	9,000
	8	dsl	1200	Wilson 75	700	9,500/4"
Crawford Drlg	1	dsl	350	M-CSCO U-15	600	8,500
Luke Grace Drlg	1	gas-btne	500	M-CSCO U-15	750	10,500
Moran E W Drlg	18	dsl	800	Spencer 7000	500	800
	6	dsl	900	Bethlehem S-55	750	10,000
Safari Drlg	1	dsl	640	Unit U-15	640	10,000
HARDIN						
Big 6 Drlg	6	dsl	800	Cabot/Franks	950	12,000
Circle Bar Drlg	1	dsl	2000	Ideco Super 7-11	2100	17,000
Faith Drlg	2	dsl	1500	National 55	1300	12,000
Goldrus Drlg	19	dsl	1110	Cabot/Franks 750	560	10,000/4"
Loffland Bros	110	dsl	2160	Brewster N-12	2400	22,500
Resource Drlg	15	dsl	1560	National 80-B	1835	14,000
Stone M L Drlg	2	gas	100	Wilson Jr	100	2,000
Transcontinental Equip	83	dsl	1000	Gar-Den 800	1000	13,000
HARRIS						
Bawden Drlg	3	scr	2100	National 110-E	1500	16,000
Bawden Peter Drlg	2	dsl-elec	2400	National 1320-UE	2000	22,000/5"
Landford Drlg	3	dsl	300	Joy	200	2,000
Nicklos Drlg	78	dsl	1400	National 80-B	1080	14,000
San Jacinto Drlg	2	gas-dsl	1250	Cardwell	600	9,000
Southland Drlg	1	dsl	700	EMSCO GB-500	700	10,000
	9	dsl	600	Brewster N-45	600	7,500
T-L Drlg	10	dsl	2000	Brewster N-75	1200	12,500
HARRISON						
Atco Drlg Southern	53	dsl	1200	National 610-UE	1200	12,000
Butler-Johnson	12	dsl	1300	Gar-Den M-700	1300	12,500

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Avail-able to Drwwks	Rated Depth with 4½" Pipe
TEXAS (Cont'd)						
HARRISON (Contd)						
France Drlg	4	dsl	1300	Gar-Den 500	800	11,000
Gibson Drlg	2	dsl	526	Wilson Mogul 65	398	5,000
Justiss Oil	14	dsl	800	EMSCO GB-500	900	11,000
	32	gas-btne	700	Bethlehem 450	900	12,000
	38	dsl	2600	EMSCO J-1100	2600	20,000
	8	dsl	450	EMSCO GA-500	900	11,000
Lohmann-Johnson Drlg	17	gas	800	M-CSCO U-15 S/N 356	600	10,000
Noble Drlg	OW-77	dsl	800	OILWELL 760	800	14,000
Transcontinental Drlg	23	dsl	1000	Brewster N-75	1000	12,000
	35	dsl	1000	Gar-Den 800-M	1000	13,000
HASKEL						
Morrison Drlg & Prod	101	dsl	450	National T-20	476	6,000
HEMPHILL						
Act Drlg	2	dsl	1750	National 125	1950	23,000
Baker & Taylo Drlg	2	dsl	1400	M-CSCO U-20	1400	20,000
	3	dsl	1200	M-CSCO U-20	1200	18,000
Drillers	24	dsl	700	Brewster N-55	700	11,000
	27	dsl	700	EMSCO GB-500	750	10,000
Hudson Leonard Drlg	3	dsl	500	M-CSCO U-15	900	11,000
	5	dsl	550	Brewster N-7	900	11,500
Parker Drlg	164	dsl	1650	OIME SL-1500-P	1650	20,000
Quarles Drlg	6	dsl	2000	Brewster N-95	2200	22,000
Trigg Drlg	7	dsl	1200	Brewster N-95	1600	20,000
	8	dsl	1200	National 1215	1600	20,000
Unit Drlg & Expl	11	dsl	1000	Gar-Den 700	1300	14,000
	14	dsl	1000	Gar-Den 700	800	14,000
	18	dsl	1000	Gar-Den 500	1300	15,000
	19	dsl	700	Gar-Den	960	12,000
Viersen & Cochran Drlg	6	dsl	2000	Bethlehem 1013	2400	25,000
HENDERSON						
Butler-Johnson	11	dsl-elec	2000	National 110-UE	2000	20,000
FWA Drlg	20	dsl	1600	Wilson Super Atlas	1000	13,000
Maxwell Herring Drlg	3	dsl	1000	Wilson Atlas	1000	12,000
HIDALGO						
Blocker Drlg	1	dsl	815	Cabot/Franks Series 750	650	9,500
	14	dsl	2500	National 110	2730	20,000
	17	dsl	825	Spencer	750	6,000
Delta Drlg	20	dsl-el-scr	2600	EMSCO C-2	3456	20,000
	87	dsl-scr	2000	EMSCO D-3	2592	16,000
Dixilyn-Field Drlg	12	dsl	2600	National 110-M	2331	18,000
	5	dsl	1850	National 110	1638	18,000
	9	dsl	2650	National 130	2331	25,000
Harkins & Co	1	dsl	1800	EMSCO C-Type III	1800	18,000/5"
	7	dsl	1650	National 110	1650	16,000/5"
Resource Drlg	4	dsl	1560	National 80-B	1835	14,000
Willis Drlg	2	dsl	1000	Bethlehem B-Line MC-450	1000	12,000
	4	dsl	1200	Brewster N-85	1200	14,000
	6	dsl	3000	Ideco	3000	25,000
Wilson Bros Drlg	1	dsl-elec	2600	Ideco E-2100	2100	21,000
HOCKLEY						
Chico Drlg	4	dsl	1000	Unit U-15-A	878	11,000
	7	dsl	1050	EMSCO D-1	878	11,000
DB Drlg	9	dsl	830	Unit U-34	530	7,000
Kenai Drlg of Texas	28	dsl	1000	Brewster N-72	1200	10,000
	28	dsl	800	Brewster N-7	900	14,000
Norton Drlg	1	dsl	450	Wilson 65-P	900	10,000
Sitton Drlg	5	dsl	650	Wilson 75-P	900	11,500
	6	dsl	450	Wilson 75-P	900	10,000
Texland Drlg	3	dsl	775	Bethlehem S-45-E	750	9,000
Verna Corp	1	dsl	50	Brewster N-55	600	12,000
	10	dsl	700	M-CSCO U-36-A	600	12,000
	2	dsl	550	Brewster N-55	600	12,500
	26	dsl	500	Ideco H-40	400	8,000
	3	dsl	300	Brewster N-45	450	6,500
	33	dsl	550	Wilson Giant	500	9,000
	4	dsl	500	Brewster N-4	400	6,500
	5	dsl	500	Wilson Mogul	400	6,500
	6	dsl	550	Brewster N-55	600	9,000
	7	dsl	700	Wilson Giant Roadair	600	9,000
	8	dsl	500	Ideco H-40	400	6,500
	9	dsl	600	Ideco H-40	450	6,500
HOPKINS						
Butler-Johnson	2	dsl	1900	Brewster N-85	1900	15,000
Hinton W B Drlg	3	dsl	1700	National 80-B	1650	15,000
HOUSTON						
Brown Tom	25	dsl	700	Gar-Den 500	700	12,000
Justiss Oil	31	gas-btne	500	Wilson Giant Roadair	650	10,000
Loffland Bros	203	dsl	1140	M-CSCO U-15	1000	11,500
Noble Drlg	23	dsl	3135	National 1320-DE	3135	22,000
HOWARD						
DB Drlg	8	dsl	830	Bethlehem S-55	700	10,000
Davis D L Drlg	1	dsl	200	Wilson Mogul	200	3,000/4"
Fiscus Drlg	1	dsl	200	Wilson Super 38-5	200	3,200
Moran Bros	53	dsl	600	Wilson Super 38	350	4,000
Robinson Drlg of Texas	4	dsl	750	National 50-A	900	12,500
Sterling Drlg (TX)	3	dsl	800	National 50-CA	820	10,000
TEXAS (Cont'd)						
HOWARD (Contd)						
Texland Drlg	4	dsl	1290	Unit U-15	950	10,000
HUDSPETH						
Sharp Drlg	65	dsl	2000	EMSCO D-3	1836	18,000
HUNT						
Maxwell Herring Drlg	2	dsl	1034	Bethlehem M-810	926	12,000
HUTCHINSON						
Service Drlg (OK)	6	dsl	300	Unit R-U34	300	5,500
Service Drlg (TX)	1	dsl	320	M-CSCO U-34	310	4,500
IRION						
Brushy Creek Drlg	5	dsl	250	Scharm 685	500	2,850
Sweetwater Drlg	5	dsl	950	M-CSCO U-15	950	11,500
Texland Drlg	1	dsl	675	Brewster N-4	540	7,100
Transcontinental Drlg	33	dsl	898	Unit U-15	650	8,500
	34	dsl	674	Bethlehem S-55	650	8,000
Tucker Drlg	5	dsl	750	EMSCO GE-500	750	10,000
	8	dsl	550	Ideco H-40	550	9,000
Wes-Tex Drlg	8	dsl	335	Dsl	500	8,000
JACK						
Crawford Drlg	3	dsl	350	Wilson Giant	350	6,500
Lin-Mour Drlg	2	gas	380	EMSCO G-350	380	6,500
	3	gas	250	Unit 34	180	5,000
	6	dsl	700	Wilson Giant	700	9,000
	8	gas	400	EMSCO G-42	400	6,500
MND Drlg	1359	gas	450	EMSCO 350	450	6,000
	51	dsl	660	National 50	550	7,000
	1359	gas	450	EMSCO 350	450	6,000
JEFFERSON						
Bertman Petr Serv	7	dsl	634	Wilson Mogul 42	634	6,000
Butler Drlg	2	dsl	1450	Brewster N-75	1100	12,500
Cactus Drlg Corp	25	dsl	1100	Ideco 7-11	1400	12,500
Dixilyn-Field Drlg	11	dsl	2600	National 110-M	2331	18,000
Dual Drlg	21	dsl	2600	EMSCO C-1	1500	22,000/5"
Goldrus Drlg	18	dsl	1700	1000 Cabot/Franks	872	14,000
	23	dsl	870	Cabot/Franks 900	680	12,000
Loffland Bros	145	dsl	2955	M-CSCO U-1220	2955	20,000
Matagorda Drlg	15	dsl	2000	National 80-B	1500	15,000
O'Connor & Young Drlg	202	dsl-elec	2600	Brewster NE-95	1750	18,000
Power Rig Drlg	19	dsl	3000	EMSCO C-3	3300	30,000
Richards Drlg	3	dsl	1800	Brewster N-75	1200	12,500
JIM HOGG						
Flournoy Drlg	6	dsl	800	Brewster N-45	600	9,000/4"
JIM WELLS						
Magee-Poole Drlg	1	dsl	1500	Cabot/Franks 900	950	11,000
	10	dsl	1500	Cabot/Franks 900	950	11,000
	11	dsl	2000	Cabot/Franks 1200	1300	14,000
	12	dsl	1500	Cabot/Franks 900	950	11,000
	2	dsl	1500	OIME 750-SL	1155	14,000
	3	dsl	940	Cabot/Franks 750	608	9,000
	4	dsl	1500	Cabot/Franks 900	950	11,000
	5	dsl	1500	Cabot/Franks 900	950	11,000
	6	dsl	2000	OIME SL-7	1300	16,800
	7	dsl	1130	Cabot/Franks 750	1130	9,000
	8	dsl	1500	Cabot/Franks 900	950	11,000
	9	dsl	2350	Cabot/Franks	1500	18,000
Murlynson Drlg	10	dsl	1000	M-CSCO U-15	600	10,000
Padre Drlg	8	dsl	700	Brewster H-14610	750	10,000
JONES						
Dixon Drlg	8	dsl	800	M-CSCO U-34-B	400	7,000
Jones Drlg Co	51	dsl	475	Brewster N-4	475	6,000
Syntek Drlg	2	dsl	400	Wilson	250	4,500
KARNES						
BDK Drlg	9	dsl	1480	Brewster N-75	1000	12,000
Delta Drlg	63	dsl-elec	2300	EMSCO C-1	2592	16,000
KAUFMAN						
Burris Drlg	108	dsl	1200	Wilson S-42	750	11,000
KENEDY						
Blocker Drlg	16	dsl	1080	Cabot/Franks Explorer III	950	12,000
Dixilyn-Field Drlg	6	dsl	2000	Unit 914-B	1536	20,000
Flournoy Drlg	8	dsl	800	Ideco BIR-800	950	10,000
Harkins & Co	10	dsl	1620	EMSCO B-1013	1620	16,000
KENT						
McCutchen J W Drlg	4	dsl	900	Wilson 90	900	12,500
KING						
Bearden Jack E Drlg	9	dsl	600	Wilson Mogul 1980	400	6,500
Moran Bros	54	dsl	750	National T-20	400	6,000
Wes-Mor Drlg	5	gas-btne	465	M-CSCO U-15	290	7,500
KLEBERG						
Dixilyn-Field Drlg	2	dsl	1300	National 610	1040	12,000
	3	dsl	1300	Brewster N-75	1020	12,000
	4	dsl	2600	National 1625-M	3105	30,000
	7	dsl	850	National T-32	700	8,500
Pool Well Serv	114	dsl	350	Wilson Mogul 42 Double Drum	500	5,500
	27	dsl		Cabot/Franks 500	500	5,500

TEXAS (Cont'd)

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
KNOX						
Wes-Mor Drlg	1	dsl		M-CSCO U-15		8,000
LAVACA						
Cinco Drlg	9	dsl	1700	Bethlehem 650	1100	14,000
FWA Drlg	25	dsl	1350	Wilson 120	1350	16,000
	29	dsl	1800	National 110	1800	18,000
Howell Drlg	1	dsl	856	Cabot/Franks 900	900	11,000
	2	dsl	1300	Cabot/Franks 1200	1130	15,000
Loffland Bros	107	dsl	2160	Brewster N-12	2400	19,500
Resource Drlg	14	dsl	2330	National 110	2740	18,000
	16	dsl	1560	National 80-B	1835	14,000
LEE						
Cape Drlg	6	dsl	1000	Wilson Super Giant	800	11,500
Delta Drlg	81	dsl	1300	Spencer 7000	480	9,000
Dual Drlg	5	dsl	1500	Wilson Mogul	600	9,500
Hondo Drlg	2	dsl	1050	M-CSCO U-15-A	700	9,500
MGF Drlg-Lafayette	39	dsl	2450	National 125	2450	18,000
MGF Drlg-Midland	8	dsl	800	M-CSCO Rig U-15	800	10,000
Merit Drlg	8	dsl-scr	1200	OILWELL 660-E	700	11,000
Moran E W Drlg	23	dsl	1150	Wilson 75	900	10,500
Resource Drlg	18	dsl	1040	National 610	1220	12,000
Sterling Drlg (TX)	1	dsl	900	National 50-A	900	12,000
Tierra Drlg	18	dsl-elec	800	BDW-650	650	1,000
	19	dsl-elec	800	Unit 36-EA	650	12,000
	9	dsl	650	Unit U-15	700	10,000
LEON						
Atco Drlg Southern	59	dsl	2000	EMSCO 11-C	2000	18,000
Cape Drlg	1	dsl	650	Wilson 42 Mogul	500	8,500
Delta Drlg	6	dsl	260	EMSCO C-1	2592	22,000
Dual Drlg	11	dsl	2400	OILWELL 860	1400	19,000
FWA Drlg	26	dsl	2000	Gar-Den 800-M	1350	15,000
Gibson Drlg	7	dsl	895	EMSCO GB-350	660	8,500
Hinton W B Drlg	11	dsl-elec	2600	National 1320-UE	3000	25,000
Nicklos Drlg	28	dsl-elec	3000	EMSCO Electro-hoist III	3600	25,000
LIBERTY						
Delta Drlg	80	dsl	1300	Spencer 7000	480	9 000
Drillers	5	dsl	900	Unit U-15-M	1200	11,000
Goldrus Drlg	20	dsl	1950	Cabot/Franks 1200	1054	15,000
O'Connor & Young Drlg	101	dsl	1600	National 610	750	12,000
LIMESTONE						
Delta Drlg	15	dsl	1600	EMSCO D-3	1040	12,500
	21	dsl	2600	Gar-Den 1100	2592	17,000
Justiss Oil	36	dsl	1000	1013	1200	16,000
MGF Drlg-Lafayette	38	dsl	1800	EMSCO Model C-1	1800	17,000
LIPSCOMB						
Helmerich & Payne Intl Drlg	54	dsl	1450	OILWELL 76	1100	16,000
Hudson Leonard Drlg	1	dsl	500	M-CSCO U-15	900	11,000
	5	dsl	500	M-CSCO U-15	900	11,000
Midco Drlg	1	dsl	680	Unit U-15	680	9,000
	3	dsl	750	Unit 750	750	12,500
Moran Bros	64	dsl	1000	EMSCO GA-500	750	10,000
Quarles Drlg	5	dsl	850	National 50-A	500	12,000
Service Drlg (OK)	12	dsl	800	EMSCO D-2	1000	1,300
Service Drlg (TX)	5	dsl	600	EMSCO U-15	800	10,000
Sharp Drlg	38	dsl	1450	Bethlehem M-58	988	12,000
Unit Drlg & Expl	2	dsl	700	Unit U-15	960	11,000
	4	dsl	500	Unit U-15	960	10,000
Zenith Drlg	3	dsl	800	Brewster N-75	800	10,000
LIVE OAK						
Atco Drlg Southern	19	dsl	800	OILWELL 66	800	10,000
Buzzini Drlg	10	dsl	3600	OILWELL M-2000	2400	25,000
	9	dsl	3600	OILWELL M-200	2400	25,000
Delta Drlg	88		2600	EMSCO C-1	3456	18,000
Harkins & Co	8	dsl	1700	National 110	1700	16,000
Loffland Bros	88	dsl-elec	2160	M-CSCO U-712	2400	18,000
PRC Drlg	7	dsl	1700	Gar-Den 800-M	1040	16,000
Texas Drlg	5	dsl	1700	Cabot/Franks M-2550	1200	17,000
LOVING						
Loffland Bros	118	dsl-elec	3200	M-CSCO U-1220-EBD	3000	28,000
	331	dsl	2160	M-CSCO U-1220	2400	18,000
MGF Drlg-Midland	201	dsl	1600	National 1320-UE	2000	30,000
	202	dsl	1600	National 1320-UE	2000	30,000
Parker Drlg	198	gas	1600	OIME 1500	1600	22,000
	39	gas	1700	OIME Hercules 2500-M	2000	23,000
	65	gas	2000	National 100-M	2000	23,000
	66	gas	2400	National 130	2400	25,000
Quarles Drlg	2	dsl	1800	OIME 1000	1000	18,000
Rowan Drlg US	18	dsl	3200	EMSCO A-1500	2500	30,000
Santa Fe Drlg Western	10	dsl-elec	2000	EMSCO Electro-hoist II	1800	22,000
	2	gas	1850	Bethlehem B-1013	2118	21,000
Sharp Drlg	35	dsl	2600	Bethlehem 1013	2742	23,000
	43	dsl	2940	OILWELL M-2000	2742	30,000
	55	dsl	2970	Gar-Den 2100	2742	30,000
	59	dsl	2600	Bethlehem MC-950	2742	23,000
	61	dsl	2600	M-CSCO U-914-C	2742	23,500
	66	dsl-elec	2600	M-CSCO U-1220-E	2742	30,000
LOVING (Contd)						
Sharp Drlg	67	dsl	2600	M-CSCO U-914-C	2742	23,500
Tri-Service Drlg	6	gas-btne	1350	OILWELL 96	1350	16,000
LUBBOCK						
DB Drlg	1	dsl	720	Brewster N-4	540	7,500
	3	dsl	675	Brewster N-4	480	7,000
Norton Drlg	3	dsl	500	Wilson 75	900	10,500
LYNN						
Norton Drlg	4	dsl	500	Wilson 75	900	10,500
MC CULLOCH						
Commercial Drillers	1	dsl	300	Cabot/Franks T-65	270	4,000
MC MULLEN						
Delta Drlg	94	dsl-scr	2000	EMSCO D-3	2592	16,000
Harkins & Co	9	dsl	2100	EMSCO A-1100	2100	18,000/5"
Southland Drlg	5	dsl	700	Brewster N-55	700	10,000
MADISON						
Delta Drlg	40	dsl	1500	EMSCO D-2	784	11,000
F-W Drlg	11	dsl	750	Brewster N-46	800	12,000
Rosamond Drlg	5	dsl	1450	Bethlehem MC-450	1275	13,500
Rotary Drlg	1	dsl	800	EMSCO	700	10,500
United Drlg Co of Tyler	6	dsl	1200	Bethlehem M-58	800	13,000
MARION						
Globe Drlg	6	dsl	700	EMSCO C-50	700	10,000
Maxwell Herring Drlg	14	dsl	1000	Wilson Giant	900	12,000
MARTIN						
Brahaney Drlg	1	gas	900	National 75-CA	900	12,000
Brown Tom	24	dsl	1100	Gar-Den 700	1100	15,500
	5	dsl	700	National 50-CA	700	10,500
Cactus Drlg Corp	24	dsl	1000	National 75	1476	13,000
	4	dsl	1200	National 55	1400	14,000
FWA Drlg	11	dsl	1000	Wilson Giant	800	10,000
MGF Drlg-Midland	11	dsl	800	Bethlehem M-58	800	12,500
Robinson Drlg of Texas	5	dsl	750	M-CSCO U-15	900	9,500
Tri-Service Drlg	2	gas-btne	700	OILWELL 66	700	10,000
MATAGORDA						
O'Conner & Young Drlg	141	dsl-elec	2000	OIME SL-7	1000	14,000
	201	dsl-elec	2600	Brewster NE-95	1750	18,000
PRC Drlg	3	dsl	1250	Brewster N-46	730	10,000
Resource Drlg	5	dsl	2330	National 110	2740	18,000
Richards Drlg	8	dsl	2500	OILWELL 860	2400	18,000
Southland Drlg	11	dsl	2300	M-CSCO A-1500	2300	24,000
MAVERICK						
Sundown Drlg	1	dsl	450	EMSCO 160-GB	400	5,500
	2	dsl	400	Brewster N-35	350	5,500
MIDLAND						
Brown Tom	13	dsl	700	M-CSCO U-15-CA	700	10,000
Cactus Drlg Corp	1	dsl	1700	National 110	2145	18,000
	20	dsl	850	Brewster	540	7,000
FWA Drlg	2	dsl	1200	Wilson Super Giant	1050	13,000
Hillin Drlg	2	dsl	800	EMSCO G-500	800	11,000
MITCHELL						
GCO Drlg	2	dsl	640	BDW 450	450	7,500
Wes-Tex Drlg	12	dsl	335	Brewster N-4	500	8,000
	14	dsl	335	Brewster N-4	500	8,000
MONTAGUE						
Burns L D Drlg	5	dsl	744	Bethlehem S-55	600	10,000
Crawford Drlg	9	dsl	350	Wilson Roadaire	350	7,000
MND Drlg	61	dsl	600	M-CSCO U-15	600	9,000
MONTGOMERY						
Cactus Drlg Corp	3	dsl	1500	National 80-B	1770	16,000
Penrod Drlg	107	dsl	1000	National 80-B	1760	15,000
	118	dsl	1600	National 1625-M	3000	30,000
Richards Drlg	5	gas-btne	1200	Brewster N-75	900	12,500
MOORE						
Service Drlg (OK)	11	dsl	400	Unit R-U34	400	5,500
Service Drlg (TX)	6	dsl	320	M-CSCO U-34	310	5,000
Stahlco Drlg	1	dsl	510			5,000
	2	dsl	510	Ingersoll T-5	485	5,000
NACOGDOCHES						
Gibson Drlg	5	dsl	1030	Wilson 75-P	700	9,000
Wheless Drlg	10	dsl	1800	National 100	1800	14,000
NAVARRO						
France Drlg	3	elec	2400	OILWELL E-760	2400	17,000
FWA Drlg	28	dsl	1500	Gar-Den 1100	1500	18,000
Globe Drlg	5	dsl	850	OILWELL 76	1000	14,000
	7	dsl	1350	Gar-Den 1100	1500	20,000
Schlensker Drlg	3	dsl	700	OILWELL 760	1500	14,000
NEWTON						
Delta Drlg	90	dsl-elec	2000	EMSCO D-3	2592	16,000
Murco Drlg	42	dsl-el-scr	2800	OILWELL E-2000	2000	25,000
NOLAN						
Bandera Drlg	1	dsl	750	MAC 300	475	7,500
	5	dsl	650	MAC 300	475	7,500
	7	dsl	750	MAC 300	400	7,500
DB Drlg	10	dsl	675	Brewster N-4	480	7,000
F-W Drlg	6	dsl	600	National T-20	400	6,000
	7	dsl	700	Brewster N-4	500	7,000

TEXAS (Cont'd)

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
NOLAN (Contd)						
GCO Drlg	1	dsl	640	National T-20	450	7,500
Herb Expl	1	btne		Failing 1500	100	1,500/2⅞"
Mesa Drlg	2	dsl	300	Weiss W-45	500	
Wes-Tex Drlg	16	dsl	335	Brewster N-4	500	8,000
NUECES						
Blocker Drlg	12	dsl	2000	OILWELL 96	2400	20,000
Corpus Christi Drlg	6	dsl	300	Brewster 550	450	6,000
CRC Mallard Well	11	dsl	800	Wilson Model 90	800	11,000
Dixilyn-Field Drlg	1	dsl	1300	Brewster N-75	1000	12,000
Flournoy Drlg	3	dsl	1560	M-CSCO U-40	1040	12,000
Harkins & Co	14	dsl	1150	Cabot/Franks 900	900	11,000/4"
	4	dsl	1260	Brewster N-75-A	1260	12,500
J & C Drlg	9	dsl	1050	Wilson 600	630	9,000
New & Hughes Drlg	11	dsl	900	EMSCO GA-500	600	11,500
PRC Drlg	6	dsl	1790	Brewster N-75	1040	13,000
Rhodes & Hicks Drlg	5	dsl	340	Cabot/Franks 500	450	6,000/4"
Texas Drlg	2	dsl	1700	Brewster N-7	1200	12,500
OCHILTREE						
Baker & Taylor Drlg	10	dsl	870	M-CSCO U-15	870	11,000
	12	dsl	870	M-CSCO U-15	870	11,000
Eagle Drlg Inc	4	dsl	1100	M-CSCO U-15	850	10,000
Hudson Leonard Drlg	2	dsl	500	M-CSCO U-15	900	9,000
	7	dsl	550	M-CSCO U-15	900	11,500
Midco Drlg	2	dsl	750	Unit U-15	750	12,500
Sage Drlg	6	dsl	400	EMSCO 350	400	8,000
Service Drlg (OK)	13	dsl	1100	Unit R-U34	900	12,000
	7	dsl	300	Bethlehem S-45	900	12,000
	4	dsl	500	M-CSCO U-15	800	9,200
Zenith Drlg	1	dsl	700	Brewster N-75	700	9,500
OLDHAM						
Baker & Taylor Drlg	1	dsl	870	M-CSCO U-15	870	10,000
ORANGE						
Big 6 Drlg	7	dsl	800	Ideco	600	10,000
Butler Drlg	5	dsl	1650	Brewster N-95	1650	18,000
PALO PINTO						
E & H Drlg	6	dsl	600	Wilson Mogul	350	6,500
IX Drlg	4	dsl	476	Wilson Mogul 42 Roadair	476	6,000
Lin-Mour Drlg	4	gas	400	Wilson Mogul	310	5,000
MND Drlg	57	dsl	500	National Ideal 50	500	6,000
Min-Tex Drlg	29	dsl	400	Duggam	500	7,000
Sawyer Drlg & Serv	3	dsl	1100	Brewster N-7	1100	12,000
PANHANDLE						
Petra Drlg	26	dsl	1000	National 55	1000	12,000
PANOLA						
Burris Drlg	104	dsl	800	EMSCO 350	500	10,000
Butler-Johnson	7	dsl	1200	National 55	1200	12,500
	8	dsl	2300	Gar-Den 1500	2200	20,000
	9	dsl	1200	Gar-Den 700	1200	12,000
Delta Drlg	22	dsl	1600	EMSCO D-3	1560	12,500
	74	dsl	1000	Spencer 7000	480	9,000/4"
France Drlg	5	elec	2400	OILWELL 760-E	2400	17,000
	6	dsl	1300	National 610	900	13,000
Justiss Oil	30	dsl	1000	Bethlehem 1013	1400	17,000
Murco Drlg	38	dsl-el-scr	1700	OILWELL 660-E	700	12,000
Paramount Drlg	11	dsl	1200	Bethlehem 450	1200	12,500
PARKER						
IX Drlg	1	dsl	950	EMSCO G-500	950	8,500
	3	dsl	392	Bethlehem	475	8,500
Min-Tex Drlg	34	dsl	400	Hyster Mod B	500	7,500
PECOS						
Cherokee Drlg & Dev	4	gas	1150	Wilson 75	900	11,000
Delta Drlg	36	dsl	2600	EMSCO C-2	2331	23,000
	4	dsl	2150	National 100	1560	16,000
Dual Drlg	19	dsl	2000	OILWELL 760	1000	16,000
Holliday Drlg	1	dsl	700	Gar-Den 700	1000	12,000
MGF Drlg-Midland	203	dsl	1300	National 110-UE	2000	20,000
Norwood A N	1	dsl	450	Wilson Super 38	350	5,500
Parker Drlg	121	dsl-elec	2700	Ideco E-3000	2700	30,000
	184	gas-elec	2750	National 1625-DE	2750	30,000
	74	gas	1800	National 100-M	1800	22,000
	87	gas	2000	Ideco 2000	2000	25,000
	90	gas	2000	National 130	2000	25,000
Penrod Drlg	114	dsl	1600	National 1625-M	3000	30,000
	121	dsl	1600	National	3000	30,000
Rod Ric	11	dsl	450	National T-20	440	5,000/4"
Rowan Drlg US	8	dsl	2600	M-CSCO U-1220-S	2400	25,000
Santa Fe Drlg Western	14	dsl	3200	EMSCO C-3-E	2000	30,000
	3	dsl-elec	2600	EMSCO A-1500-E	2700	30,000
	8	dsl-elec	2600	EMSCO A-1500-E	2700	30,000
Sharp Drlg	34	dsl	2925	Bethlehem 1013	2742	30,000
	60	dsl-elec	3200	EMSCO C-3 Type II	3656	30,000
	64	dsl	2200	OILWELL 760	1836	18,000
POLK						
Cliffs Drlg	33	dsl	1000	National 80-B	1000	14,500
Glasscock Drlg	67	dsl	2700	National 1320	2700	20,000
Hinton W B Drlg	8	dsl	1300	Spencer 7000	400	10,000/4"
Penrod Drlg	116	dsl	1300	National 1320-M	2000	25,000
POTTER						
Moran Bros	57	dsl	600	Wilson Super 38	350	4,000
Sharp Drlg	68	dsl-elec	2800	OILWELL M-2000-E	2742	30,000
	71	dsl-elec	2600	Unit U-914-EC	2742	23,500
REAGAN						
FWA Drlg	1	dsl	1000	Wilson Giant	800	10,000
	12	dsl	1000	Wilson Giant	800	10,000
	8	dsl	1000	Wilson Giant	800	10,000
MGF Drlg-Midland	2	dsl	800	M-CSCO U-15	800	10,000
Sterling Drlg (TX)	11	dsl	375	Ideco H-30	480	6,500
REEVES						
Cactus Drlg Corp	31	dsl	2000	National 125	2810	25,000
Loffland Bros	37	dsl-elec	2300	M-CSCO U-914-B	2000	18,000
Santa Fe Drlg Western	4	dsl-elec	2600	EMSCO C-111-E	2700	30,000
Tri-Service Drlg	10	dsl	1800	OILWELL 860	1800	21,000
REFUGIO						
FWA Drlg	16	dsl	600	Wilson Mogul 42	800	9,000
Padre Drlg	3	dsl	700	Brewster N-55	800	10,000
ROBERTS						
Helmerich & Payne Intl Drlg	46	dsl	1200	EMSCO GB-800	1200	13,500
Hudson Leonard Drlg	4	dsl	500	M-CSCO U-15	900	11,000
Moran Bros	63	dsl	1300	National T-45	800	10,000
Moran E W Drlg	29	dsl	1400	Gar-Den 700	800	12,500
Service Drlg (TX)	12	dsl	800	EMSCO D-2	900	12,000
Tierra Drlg	21	dsl-elec	800	BDW-800	800	14,000
Zenith Drlg	4	dsl	1100	Unit U-15	1100	12,000
ROBERTSON						
Alanco Drlg	1	dsl	500	Ideco H-40	500	8,500
Delta Drlg	44	dsl	1700	Brewster N-95	1560	16,000
RUNNELS						
Bandera Drlg	2	dsl	470	Unit 34	360	6,500
Hack Drlg	1	dsl	350	M-CSCO U-34	350	7,000
	2	dsl	350	Brewster N-4	350	5,500
Safari Drlg	3	dsl	340	Brewster N-4	300	7,000
	4	dsl	310	National T-20	270	6,000
	5	dsl	370	EMSCO GA-250-T	280	5,000
	6	dsl	300	EMSCO U-34	370	6,000
Syntek Drlg	1	dsl	500	National T-12	500	5,000
RUSK						
Burris Drlg	107	dsl	1000	Brewster N-55	750	10,000
Gibson Drlg	4	dsl	506	Wilson Mogul Model 65	398	5,000
Hinton W B Drlg	5	dsl	900	Spencer 7000	450	10,000/4"
Justiss Oil	15	dsl	450	Bethlehem 45-E	300	6,500
	17	dsl	350	Bethlehem S-45-E	350	7,500
	21	dsl	800	EMSCO GB-500	1000	12,000
	33	dsl	1000	OILWELL 96	1400	17,000
	34	gas-btne	700	Bethlehem M-58	1000	12,000
	5	dsl	450	Bethlehem S-45-E	300	6,500
Lester Dan Drlg	8	dsl	1850	OILWELL 760	1500	16,000
Thunderbolt Drlg	50	dsl	1750	Cabot/Franks 1200	1300	13,500
Woolf & Magee	2	dsl	1550	Gar-Den 700	1000	13,500
	3	dsl	1450	Gar-Den 700	1275	13,500
SAN AUGUSTINE						
Rosamond Drlg	6	dsl	1650	EMSCO A-550	1275	14,000
SAN PATRICIO						
Blocker Drlg	6	dsl	1300	Cabot/Franks HT Expl Rocket	950	10,000
Corpus Christi Drlg	5	dsl	300	Wilson Super 38	250	6,000/3½"
F-W Drlg	12	dsl	1000	Brewster N-46	800	13,000
PRC Drlg	5	dsl	1198	Gar-Den 700-M	800	13,000
Rhodes & Hicks Drlg	7	dsl	600	Cabot/Franks 700	650	8,500/4"
Southland Drlg	10	dsl	1800	Bethlehem 810	1600	17,000
SCHLEICHER						
Brown Tom	14	gas	700	M-CSCO U-15	700	10,000
Caraway Frank Drlg	1	dsl	750	EMSCO GB-250	570	7,500
	2	dsl	1300	EMSCO GB-350	750	8,500
Transcontinental Drlg	30	dsl	1000	Brewster N-55	850	11,000
Tucker Drlg	7	dsl	375	Bethlehem 5-60	600	7,000
SCURRY						
DB Drlg	2	dsl	675	National T-32	540	8,500
	6	dsl	1050	Brewster N-45	650	9,000
GCO Drlg	5	dsl	820	M-CSCO U-15	850	10,000
	6	dsl	620	Brewster N-45	600	8,000
Hack Drlg	4	dsl	225	National T-8	250	4,000
IX Drlg	7	dsl	476	Cardwell S-350	416	7,500
Moran Bros	55	dsl	600	Wilson Super 38	350	4,000
SHACKELFORD						
Jones Drlg Co	53	dsl	250	Houston Portable	220	3,000
	55	dsl	500	Bethlehem S-45	475	8,500
	5	dsl	600	Bethlehem S-45	400	6,000
SHELBY						
Atco Drlg Southern	4	dsl		National 55		12,000
Sawyer Drlg & Serv	9	dsl	800	Brewster N-45-M	800	10,000
United Drlg Co of Tyler	2	dsl	1200	Bethlehem M-58	800	13,000
SHERMAN						
Baker & Taylor Drlg	9	dsl	870	M-CSCO U-15	870	11,000

TEXAS (Cont'd)

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
SHERMAN (Contd)						
Service Drlg (TX)	7	dsl	320	Bethlehem S-45	310	5,000
SMITH						
Burris Drlg	109	dsl	1200	EMSCO GC-50-C	750	13,500
Delta Drlg	54	dsl	2000	National 80-B	1560	14,000
Globe Drlg	8	dsl-elec	1500	Gar-Den GD-1000	1600	20,000
	9	dsl-elec	3000	Gar-Den GD-100	1600	20,000
Lester Dan Drlg	6	dsl	1800	Wilson 150-A	1800	16,000
Thunderbolt Drlg	51	dsl	2600	National 100-TC	2586	20,000
United Drlg Co of Tyler	11	dsl	1200	National 370	800	10,000
Verna Corp	21	dsl	550	M-CSCO	600	10,000
	22	dsl	550	M-CSCO U-15	600	10,000
	23	dsl	550	M-CSCO U-15	600	10,000
	24	dsl	550	M-CSCO U-15	600	10,000
	2	[illegible]	1000	M-CSCO U-15	600	10,000
	2	[illegible]	1000	M-CSCO U-15	600	10,000
	28	dsl	1000	M-CSCO U-15	600	10,000
	29	dsl	1000	M-CSCO U-15	600	10,000
	30	dsl	550	M-CSCO U-15	600	10,000
	35	dsl	1000	Ideco 711-SJ	1200	14,000
STARR						
Alanco Drlg	2	dsl	500	Ideco H-40	600	9,500
Flournoy Drlg	9	dsl	900	EMSCO C-50	480	9,000/4"
Harkins & Co	12	dsl	1050	Cabot/Franks 750	650	9,500
	13	dsl	1477	Cabot/Franks 1000	1000	12,000
STEPHENS						
E & H Drlg	4	LPG	550	M-CSCO U-15	550	7,500
Faulk Drlg	4	dsl	450	Brewster N-4	450	6,000
Jones Drlg Co	54	dsl	475	Bethlehem S-45	475	7,000
	4	dsl	600	Bethlehem S-45	400	5,000
Min-Tex Drlg	32	dsl	400	Hyster Mod B	500	7,500
Tierra Drlg	3	dsl	650	Wilson Toroaia	650	7,000
	7	dsl	550	National T-12	550	5,400
Wes-Mor Drlg	6	gas-btne		M-CSCO U-34		4,500
STERLING						
Cam Drlg	2	dsl	510	Bethlehem S-55	750	10,000
Kenai Drlg of Texas	25	dsl	700	EMSCO GB-500	800	11,000/4"
Robinson Drlg of Texas	2	dsl	750	M-CSCO U-15	900	10,000
Tucker Drlg	2	dsl	750	EMSCO GB-500	750	10,000
Wes-Tex Drlg	1	dsl	650	National 50-A	650	10,000
STONEWALL						
DB Drlg	4	dsl	675	Unit U-34	540	7,000
Safari Drlg	2	dsl	370	Cardwell L-350	370	7,000
Sojourner Drlg	3	dsl		M-CSCO U-15	550	7,000
	4	dsl		M-CSCO U-15	550	7,000
Tri-J Drlg	5	dsl	375	Wichtex R-6-A	350	5,000
Wes-Mor Drlg	12	dsl	2500	Unit U-15	2500	9,000
SUTTON						
Brown Tom	11	gas	500	M-CSCO U-15	500	10,000
Delta Drlg	70	dsl	1000	Spencer 6000	380	7,000
Tucker Drlg	4	dsl	214	M-CSCO U-15	450	7,500
	9	dsl	750	National	750	10,000
Wes-Tex Drlg	15	dsl	335	Brewster N-4	500	8,000
TAYLOR						
F-W Drlg	2	dsl	600	M-CSCO U-34	450	7,000
	4	dsl	500	M-CSCO U-34	500	65,000
TERRELL						
DB Drlg	13	dsl	1290	National 50-A	950	10,000
	14	dsl	1290	National 50-A	950	10,000
Delta Drlg	2	dsl	1400	Gar-Den 700-M	784	12,500
	61	dsl	1800	Ideco Super 7-11	1040	12,500
Wes-Tex Drlg	7	dsl	335	Brewster N-4	450	8,000
TERRY						
Cactus Drlg Corp	15	dsl	12000	Bethlehem 650	1200	15,000
	34	dsl	1290	National 75	1230	12,000
Chico Drlg	1	dsl	1100	BDW-650-M	878	12,500
	6	dsl	1300	EMSCO D-2	1224	14,000
Norton Drlg	7	dsl	450	Wilson 65	600	8,500
Resource Drlg	RD-26	dsl	1560	National 80-B	1835	14,000
Sitton Drlg	4	dsl	450	Wilson 75-P	900	10,000
Tahoe Drlg	2	dsl	850	Brewster N-4	458	7,000
Willbaos Drlg	4	dsl	1700	National 55	1260	14,000
THROCKMORTON						
Carter Dev	2	dsl	300	Wilson Mogul	300	6,000
E & H Drlg	1	dsl	700	M-CSCO U-15	700	7,500
F-W Drlg	5	dsl	600	Ideco H-25	450	6,000
Min-Tex Drlg	33	dsl	350	Wilson Mogul	475	5,200
Oilwell Drlg	2	dsl	476	Bethlehem S-50	476	5,500
	5	dsl	476	Wilson Mogul	476	5,500
	6	dsl	476	Wilson Super	5500	
Simmons Drlg	46	dsl	350	Troy M-500	350	7,500
Tierra Drlg	4	dsl	500	National T-12	500	6,000
TITUS						
Gibson Drlg	8	dsl	529	Wilson 65	380	5,000
TOM GREEN						
DB Drlg	11	dsl	770	Shaffer 5036000	540	8,000
Texland Drlg	2	dsl	750	Unit U-34	480	7,100
Tucker Drlg	3	dsl	350	Brewster N-45	600	6,500
TYLER						
Atco Drlg Southern	11	dsl		National 55		12,000

TEXAS (Cont'd)

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
TYLER (Contd)						
Safari Drlg	7	dsl	480	EMSCO G-42	560	7,000
UNDER CONSTRUCTION						
Resource Drlg	RD-27	dsl	1560	National 80-B	1835	14,000
	RD-28	dsl	1040	National 610	1220	12,000
	RD-29	dsl	1560	National 80-B	1835	14,000
	RD-30	dsl	3105	National 1625	3740	30,000
UPSHUR						
Rainbow Drlg	5	dsl	2000	Cabot/Franks 1200	1200	14,000
United Drlg Co of Tyler	5	dsl	1200	Brewster N-75	1200	15,000
UPTON						
Brown Tom	4	dsl	840	National 50-CA	840	10,000
FWA Drlg	17	dsl	1000	Wilson Giant	800	10,000
	3	dsl	1200	Wilson Super Giant	1050	13,000
	30	dsl	1000	Wilson Giant	800	10,000
	4	dsl	1000	Wilson Giant	800	10,000
MGF Drlg-Midland	10	dsl	750	Bethlehem M-58	750	12,000
VAL VERDE						
Penrod Drlg	25	dsl	2600	EMSCO C-2	1950	25,000
VICTORIA						
BDK Drlg	1	dsl	700	Wilson Giant	580	8,500/4"
	10	dsl	1000	Brewster N-46	900	10,000
FWA Drlg	18	dsl	500	Wilson Mogul 42	500	6,500
G-E Drlg	2	dsl	500	Unit 34	500	6,700
	4	dsl	460	Bethlehem S-45-B	460	5,600
	6	dsl	900	National 50-CA	900	10,100
	8	dsl	500	Ideco H-400-B	500	8,000
Padre Drlg	2	dsl	500	Brewster H-4210	400	7,500
WALKER						
O'Connor & Young Drlg	102	dsl	2000	National 610	750	12,000
WALLER						
Cliffs Drlg	41	dsl	1300	National 1320	1300	25,000
Eagle Prod & Drlg Serv	1	dsl-elec	2000	OILWELL 840-E	3000	20,000
Harkins & Co	3	dsl	1260	Brewster N-75-A	1260	12,500
Penrod Drlg	111	dsl	1950	National 1625-M	3000	30,000
	124	dsl	1600	National 1625-M	3000	30,000
WARD						
Brahaney Drlg	6	gas	1200	National 100	1200	15,000
Brown Tom	15	gas	700	M-CSCO U-15	700	10,500
Johnn Drlg	4	dsl	700	M-CSCO U-15	700	8,500
	5	dsl	700	M-CSCO U-15	700	8,500
Kenai Drlg of Texas	13	dsl	800	EMSCO GA-250-T	400	6,500
Landford Drlg	1	dsl	150	Mayhew	150	1,000
Loffland Bros	117	dsl-elec	3200	M-CSCO U-1220-EBD	3000	28,000
Moran Drlg	39	dsl-elec	2600	M-CSCO C-1	1500	20,000
Norwood A N	3	gas	1000	Brewster N-4	450	6,000
Rowan Drlg US	12	dsl	2000	National 1320-M	2100	18,000
Santa Fe Drlg Western	5	gas	2600	Bethlehem B-1013	2118	22,000
	6	dsl-elec	2600	EMSCO C-111	2700	30,000
WASHINGTON						
Delta Drlg	17	dsl-el-scr	2300	EMSCO C-1	2592	16,000
Richards-Armstrong	7	dsl	1900	Cabot/Franks 1000	900	12,500
Welsh Drlg & Serv	12	dsl	1300	National 100	1200	14,500
WASHITA						
Helmerich & Payne Intl Drlg	48	dsl	1820	National 110	1820	22,000
WEBB						
Bearden Jack E Drlg	3	dsl	1200	Wilson Mogul	700	9,500
Delta Drlg	89	dsl-scr	2000	EMSCO D-3	2592	16,000
Dixilyn-Field Drlg	10	dsl	1295	National 55	1040	12,000
	20	dsl	1500	Brewster N-75	1040	12,000
	24	dsl	2500	OILWELL 860	2331	18,000
Dixon Drlg	12	dsl	800	Brewster N-4	300	7,000
	9	dsl	600	Spencer 5000 Port	300	6,000
Harkins & Co	11	dsl	1260	Brewster N-75	1260	12,500
	2	dsl	1500	Brewster N-95	1500	14,000
	5	dsl	950	Cabot/Franks 750	650	9,500/4"
	6	dsl	1260	Brewster N-75-A	1260	12,500
Robinson Bros Drlg	14	dsl	900	National 50	800	11,000
Southland Drlg	4	dsl	850	Brewster N-7	900	10,000
WHARTON						
Bilbo Drlg	1	dsl	500	Brewster N-4-A	500	8,000
Frio Drlg	2	dsl	800	National J-45	600	10,000
Padre Drlg	6	dsl	500	Brewster H-4210	400	7,500
	7	dsl	700	Brewster H-14610	750	10,000
PRC Drlg	1	dsl	800	Brewster H-4610-A	500	8,000
WHEELER						
Arden Drlg	1	dsl-elec	1600	EMSCO D-2	1200	16,000
Baker & Taylor Drlg	5	dsl	1400	M-CSCO U-20	1400	22,000
Drillers	40	dsl-elec	2100	Gar-Den 1100-E	2100	24,000
Helmerich & Payne Intl Drlg	44	dsl	2160	OILWELL 96	2160	22,000
	47	dsl	2475	OILWELL H-2000	2475	26,000
Loffland Bros	317	dsl	2250	Gar-Den 2100	2500	24,000
Moran Bros	37	dsl	1000	National 610	1000	12,000
Murco Drlg	30	dsl	2800	OILWELL N-200-B	3000	25,000
Parker Drlg	149	gas	1000	National 75	1000	16,000

TEXAS (Cont'd)

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available tc Drwwks	Rated Depth with 4½" Pipe
WHEELER (Contd)						
Parker Drlg	178	dsl	2200	OIME SL-1500-P	2200	25,000
Penrod Drlg	3	dsl	2600	National 1320-M	3425	25,000
Ratliff Drlg	31	dsl	1650	Texas Flange	1650	18,000
Robinson Bros Drlg	9	dsl-elec	1700	Ideco 1200	2000	22,000
Sandia Drlg	2	dsl	4000	EMSCO C-1	4000	22,000
Sharp Drlg	58	dsl	2670	OILWELL 96	2895	23,000
WILBARGER						
Lin-Mour Drlg	31	gas	700	Wilson Giant	700	9,000
WILSON						
Atco Drlg Southern	7	dsl	800	Ideco Super 750	800	10,500
Cinco Drlg	4	dsl	1005	Brewster N-45	780	8,500
Flournoy Drlg	4	dsl	900	Cabot/Franks Explorer III	600	9,000/4"
	5	dsl	1200	Cabot/Franks Rocket 1000	950	12,000
IX Drlg	9	dsl	850	Shaevco	650	10,000
WINKLER						
Ard Drlg	1	dsl	600	Spencer	670	8,500
Brahaney Drlg	4	gas	1200	EMSCO J-1000	1200	15,000
Cactus Drlg Corp	2	dsl	2000	EMSCO A-1500	2976	23,000
	27	gas	2000	Brewster N-20	2976	30,000
	9	dsl	1200	Brewster N-75	1476	13,500
Holliday Drlg	2	dsl	700	OILWELL 76	1200	14,000
Kenai Drlg of Texas	13	dsl	400	EMSCO GA-250	400	7,000/4"
Moran Bros	51	dsl	750	Ideco H-30	350	5,000
Norwood A N	4	dsl	600	National T-20	450	6,000
Sterling Drlg (TX)	4	dsl	1075	National 50-A	900	12,000
WISE						
Crawford Drlg	8	dsl	350	OILWELL 64-B	350	7,000
MND Drlg	1363	dsl	800	M-CSCO U-15	800	9,500
	1364	dsl	800	M-CSCO U-15	800	9,500
	52	dsl	550	National 50	550	7,000
	53	dsl	600	M-CSCO U-15	600	9,000
	55	dsl	600	M-CSCO U-15	600	9,000
	60	dsl	800	M-CSCO U-15	800	9,500
	62	dsl	600	M-CSCO U-15	600	9,000
	65	dsl	700	M-CSCO U-36A	700	12,000
	66	dsl	700	M-CSCO U-36A	700	12,000
Min-Tex Drlg	35	dsl	500	Hyster Mod A	750	14,000
Wes-Mor Drlg	10	dsl		M-CSCO U-15		7,500
	7	dsl	680	M-CSCO U-34	680	7,500
WOOD						
Gibson Drlg	1	dsl	606	Wilson Mogul 42	398	5,000
	9	dsl	1030	Wilson Mogul 75-P	700	9,000
Guffey-Schlensker Drlg	3	dsl	1270	National 75-CA	1270	14,000
Hinton W B Drlg	9	dsl-elec	2600	National 110-UE	3000	20,000
Justiss Oil	28	dsl	700	OILWELL 96	1000	15,000
Maxwell Herring Drlg	12	dsl	1500	Wilson 150-A	2500	15,000
United Drlg Co of Tyler	9	dsl	1200	Bethlehem M-58	800	12,500
YOAKUM						
Cactus Drlg (TX)	63	dsl	520	Brewster N-4	454	6,000
Cherokee Drlg & Dev	5	dsl	900	BDW 450	531	7,000
Landis Drlg	1	dsl	1000	BDW-650-M	1000	13,000
MGF Drlg-Midland	9	dsl	850	EMSCO GC-500	850	14,000
Megargel Drlg	10	dsl	750	Unit Double Jacknife U-15	750	7,000
Norton Drlg	5	dsl	500	Wilson 75	900	10,500
Rod Ric	4	dsl	750	Ideco H-40	600	8,500/4"
YOUNG						
E & H Drlg	2	dsl	400	M-CSCO U-34	325	6,000
	5	LPG	550	Wilson Giant	550	7,500
Franklin Drlg	1	dsl	300	Gar-Den 1500	300	1,500
	2	dsl	400	Gar-Den	400	2,500
Lin-Mour Drlg	5	dsl	750	EMSCO G-42	750	7,000
Luke Grace Drlg	3	dsl	500	Cardwell Model S	450	6,400
Megargel Drlg	6	dsl	350	Bethlehem S-45-B	275	6,000
Min-Tex Drlg	26	dsl	3200	Cardwell L	350	4,000
Oilwell Drlg	4	dsl	476	Ideco H-30	476	5,500
Petra Drlg	21	dsl	300	Cooper	300	6,000
	22	dsl	450	EMSCO G-42	500	6,000
Tierra Drlg	5	dsl	500	National T-12	500	6,000
ZAPATA						
Atco Drlg Southern	50	dsl	1560	National 100-HD	1560	14,000
Dixilyn-Field Drlg	19	dsl	1925	National 130	2331	20,000
	23	dsl	2800	OILWELL 860	2331	18,000
New & Hughes Drlg	10	dsl	900	EMSCO GB-500	600	11,500
Penrod Drlg	119	dsl	1600	National 1625-M	3000	30,000
Resource Drlg	19-RD	dsl	1040	National 610	1220	12,000
	2	dsl	1560	National 80-B	1835	14,000
Robinson Bros Drlg	1	dsl	1750	Brewster N-75	1500	12,000
	7	dsl-elec	1750	National 80-UE	1500	12,000
South Texas Drlg	4	dsl	500	Brewster 1046	750	10,000
Southland Drlg	2	dsl	1300	Brewster 75-A	1150	12,000
Texas Drlg	3	dsl	1700	National 50-A	1455	12,500
	6	dsl	1200	Cabot/Franks M-25	950	11,000

UTAH

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available tc Drwwks	Rated Depth with 4½" Pipe
DUCHESNE						
Anderson-Myers Drlg	14	dsl	1500	Brewster N-75-A	1800	14,000

UTAH (Cont'd)

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
DUCHESNE (Contd)						
Bomac Drlg	29	dsl	2000	OILWELL 96	2300	18,000
Dixilyn-Field Drlg	38	dsl	2000	National 110-UE	2000	18,000
Loffland Bros	223	dsl	1260	M-CSCO U-15	1000	9,000
TWT Expl	2	dsl	200	Gar-Den 15-W	200	2,000
	4	dsl	300	National T-10	300	4,000
	5	dsl	880	Model O Cardwell	880	10,000
	6	dsl	1350	National 55	1350	12,000
	7	dsl	1800	Gar-Den 800	1800	10,000
	8	dsl	1350	Ideco	1350	12,000
	9	dsl	1800	OILWELL 760	1800	14,000
EMERY						
True Drlg	14	dsl	1000	National 50-A	1000	12,000
GARFIELD						
Kenting Drlg	20	dsl-elec	2400	M-CSCO U-914-E	2000	20,000/5"
Loffland Bros	1	dsl	1290	M-CSCO 40	1440	13,000
GRAND						
Arapahoe Drlg	7	gas-btne	700	National T-45	700	10,000
Atco Drlg	18	dsl	326	326	320	8,000/3½"
Brinkerhoff-Signal	32	dsl	1000	EMSCO GC-350	465	8,000
	9	dsl	700	Brewster N-45	600	7,500
Cardinal Drlg	4	dsl	560	EMSCO GB-350-T	760	8,000/½"
Veco Drlg	8	dsl	800	Brewster 45	750	10,000
JUAB						
Parker Drlg	148	dsl	1200	OIME	11000	
Penrod Drlg	102	dsl	1600	National 610-M	964	16,000
	20	dsl	2600	National 1320-M	1950	25,000
MILLARD						
Penrod Drlg	23	dsl	2600	National	1950	25,000
Viursen & Cochran Drlg Co	13	dsl	1850	National 80-B	1500	18,000
RICH						
Parker Drlg	118	dsl	2000	National 100-M	2700	20,000
SAN JUAN						
All Western Drlg	3	dsl	840	EMSCO 15	840	10,000
Arapahoe Drlg	2	gas-btne	300	National T-32	320	8,000
	6	dsl	300	National T-32	350	8,000
Bayless Drlg	1	dsl	1500	Ideco H-1000	950	10,000
Kenai Drlg Rocky Mountain	3	dsl	1400	OILWELL 52-T	700	9,500
SANPETE						
Loffland Bros	98	dsl-elec	1400	M-CSCO U-40-E	1600	13,000
SUMMIT						
Anderson-Myers Drlg	7	dsl	1200	National 55	1400	13,000
Bomac Drlg	56	dsl	2600	Gar-Den 1100	2400	20,000
Brinkerhoff-Signal	3	dsl	1000	National 55	1000	12,000
	40	dsl	2400	National 130	2400	22,000
	7	dsl	1500	National 80-B	1500	15,000
	83	dsl-elec	2000	EMSCO D-3	2000	16,000
Dixilyn-Field Drlg	36	dsl	2000	National 110-UE	2000	18,000
Manning R L	30	dsl-elec	1600	EMSCO D-3	1000	16,000
	32	dsl	1600	EMSCO D-3	1000	16,000
Parker Drlg	116	dsl-elec	2000	National 80-B	2750	20,000
	117	gas	2000	National 110	2700	22,000
	183	dsl	1650	OIME 1500-P	1650	20,000
	56	dsl	1200	National 50-A	1800	11,000
Viersen & Cochran Drlg	8	dsl	1450	National 80-B	1554	18,000
UINTAH						
All Western Drlg	1	dsl	1200	Schramm		1,500
	2	gas	700	EMSCO U-15	700	10,000
	4	dsl	750	Superior 700	750	10,000
Atco Drlg	5	dsl	326	National T-32	326	8,000/3½"
Brinkerhoff-Signal	12	dsl	1000	National 55	1000	12,000
Loffland Bros	236	dsl	1260	M-CSCO U-15	1000	9,000
	58	dsl-elec	2000	National 80-B	2000	18,000
Westburne Drlg	65	dsl	450	National T-45	400	9,000
WASATCH						
Viersen & Cochran Drlg	11	dsl	2600	National 110	2400	20,000

VIRGINIA

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
FREDERICK						
Delta Drlg	71	dsl	500	Spencer 7000	440	9,000
WASHINGTON						
Ray Resources	7	dsl	450	Cardwell KB-500	700	8,000

WASHINGTON

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
KITTITAS						
Brinkerhoff-Signal	53	dsl-elec	2325	National 100	2325	18,000

WEST VIRGINIA

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
UNDESIGNATED						
Challenger Drlg	16-S	dsl-elec	600	EMSCO G-500	750	2,000
BRAXTON						
Union Drlg	1	dsl		Cardwell KM-250	425	6,000

WEST VIRGINIA (Cont'd)

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
CLAY						
Smith Drlg	10	dsl	3550	Challenger M-320	360	5,000/3½"
HARDY						
Delta Drlg	69	dsl		Spencer 7000	480	9,000
KANAWHA						
Ray Resources	6	dsl	450	Ideco DIR-7015	700	8,000
LINCOLN						
Hurt Clint & Assoc	2	dsl	350	Wilson Super 38	350	5,000
MC DOWELL						
Ray Resources	9	dsl	1000	Ideco H-35	400	6,500
MINERAL						
Delta Drlg	84	dsl	1800	EMSCO D-3	1560	16,000
RALEIGH						
Smith Drlg	8	dsl	350	Challenger M-2-80	360	4,500/3½"
RANDOLPH						
Ray Resources	14	dsl		National T-20	400	6,500
Union Drlg	2	dsl		Ideco BIR-5525	425	6,000
	11	dsl		Spencer 5000	350	5,000
RITCHIE						
Hurt Clint & Assoc	1	dsl	350	Wilson Super 38	350	5,000
ROANE						
FWA Drlg	13	dsl	375	Wilson Super 38	350	4,500
Hurt Clint & Assoc	4	dsl	350	Wilson Super 38	350	5,000
UPSHUR						
Union Drlg	13	dsl		Ideco BIR-5525	425	6,000
WIRT						
Ray Resources	3	dsl	450	Ideco BIR-5525	600	6,000
WOOD						
Hurt Clint & Assoc	3	dsl	350	Wilson Super 38	350	5,000

WYOMING

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
UNDESIGNATED						
Bawden Peter Drlg	21	dsl	2000	EMSCO C-1	1500	18,000
Burris Drlg	111	dsl	1000	Gar-Den 1100	1500	20,000
	112	dsl	1000	Gar-Den 1100	1500	20,000
	114	dsl	1000	Gar-Den 1100	1500	20,000
Forwest	1	dsl-el-scr	2600	Ideco E-2100	1800	22,000
	2	dsl-el-scr	2600	Ideco E-2100	1800	22,000
	5	dsl-el-scr	2000	National 80-UE	2000	15,000
	6	dsl-el-scr	2600	National 110-UE	2000	20,000
Gallagher Drlg	7	dsl	350	National T-20	475	5,000
Lord Drlg	2	dsl	2200	OILWELL M-860	1650	18,000
	3	dsl	2200	OILWELL M-860	1650	18,000
BIG HORN						
Barnhart Drlg	1	dsl	700	Ideco H-525	350	6,500
Dixilyn-Field Drlg	37	dsl	1600	National 80-UE	1800	15,000
Montgomery Drlg	44	dsl	2000	OILWELL 96	1000	20,000/5"
CAMPBELL						
Anderson-Myers Drlg	10	dsl	670	National T-32	800	8,500
Atco Drlg	20	dsl	800	EMSCO GB-500	800	10,000
Brinkerhoff-Signal	57	dsl	1560	National N-80-B	1560	17,000
Cyclone Drlg	2	dsl	800	Bethlehem M-58	800	10,000
	4	dsl	800	Unit U-15	800	9,000
	5	dsl	800	EMSCO U-15	800	10,000
Exeter Drlg Northern	10	dsl	500	Brewster N-55	750	10,500
	20	dsl	500	EMSCO GC-500	750	11,000
	21	dsl	550	M-CSCO U-15	720	9,500
	3	dsl	550	National 50-A	750	9,500
	34	dsl	500	M-CSCO U-15	750	9,500
	37	dsl	500	M-CSCO U-15	750	9,500
	38	dsl	500	M-CSCO U-15	750	9,500
	7	dsl	700	Brewster N-75	1000	12,000
	8	dsl	500	Brewster N-7	750	9,500
	9	dsl	750	Brewster N-75	1100	12,500
Green Drlg	3	dsl	1350	EMSCO GA-500	900	10,000
	4	dsl	900	Unit U-15	900	10,000
Lohmann-Johnson Drlg	4	dsl	1350	OILWELL 76-700 S/N H-27-15	600	12,000
Nicor Drlg	60	dsl	1700	National 55-M	700	15,000
	61	dsl	1400	National 610	750	12,000
Prairie Drlg	3	dsl	1000	EMSCO GB-500	1000	10,000
Republic Drlg & Serv	5	dsl-elec	1200	OILWELL 760-E	1000	14,000
Shelby Drlg	51-E	dsl-elec	1000	Ideco 725-E	750	10,000
	53-E	dsl-elec	1000	National 370-E	700	9,500
Transcontinental Drlg	53	dsl	900	National 50-A	980	9,000
	54	dsl	800	National 50-A	980	10,000
	55	dsl	1020	OILWELL 76	980	12,000
	56	dsl	1100	Ideco H-750	910	10,500
	40	dsl	1200	OILWELL 76	1224	12,500
True Drlg	15	gas-LPG	1300	National 50-A	1000	11,500
	19	dsl	1000	National 50-A	1000	12,000
Westburne Drlg	54	dsl	655	National 50-A	800	9,500
CARBON						
Atco Drlg	25	dsl	700	Ideco H-525	700	9,500
Prairie Drlg	6	dsl	1200	M-CSCO U-40	1200	14,000
CONVERSE						
Atco Drlg	12	dsl	1845	National 80-B	1845	15,000

WYOMING (Cont'd)

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
CONVERSE (Contd)						
Brinkerhoff-Signal	14	dsl	1000	National 55	1000	12,500
Exeter Drlg Northern	18	dsl	500	National 50-A	750	9,500
	36	dsl	450	Bethlehem M-58	750	11,000
Harpel Drlg	3	dsl	1150	Ideco H-725	900	10,000
	4		1250	Brewster N-46	900	12,000
Loffland Bros	163	dsl	1260	National 80-B	1500	16,000
	208	dsl	1560	National 110	1800	16,000
	234	dsl	2160	M-CSCO U-40	2400	13,000
	40	dsl	1680	Brewster N-95	2200	16,000
Lohmann-Johnson Drlg	1	dsl	670	M-CSCO U-15 S/N 537	500	8,000
	20	dsl	700	OILWELL 600	600	10,000
Westburne Drlg	7		1000	Wilson Giant	1000	12,000
Westburne Drlg	60	dsl	650	National 50-A	700	9,000
CROOK						
Atco Drlg	6	dsl	1020	National 370	700	8,500
Exeter Drlg Northern	17	dsl	500	National 50-A	750	9,500
	35	dsl	500	M-CSCO U-15	750	9,500
FREMONT						
Barnhart Drlg	4	dsl	350	Gar-Den 15-W	350	2,000
Brown Tom	17	dsl	350	M-CSCO U-15-CA	500	8,500
	21	dsl	1100	National 75-CA	1100	13,000
Dixilyn-Field Drlg	32	dsl	2300	National 130	2331	25,000
	33	dsl-elec	2000	OILWELL 940-E	3000	20,000
Exeter Drlg Northern	41	dsl	1000	Gar-Den 700	1000	13,000
Loffland Bros	119	dsl-elec	4200	EMSCO CE-3000 Type 2	3000	32,000
	8	dsl	2100	M-CSCO U-914-C	2400	20,000
Manning R L	26	gas-btne	1300	EMSCO GB-800	1365	14,000
Parker Drlg	124	dsl	2000	OILWELL 2000-E	2750	25,000
Prairie Drlg	5	dsl	1000	EMSCO GB-500	1000	10,000
Trigg Drlg	6	dsl-elec	2400	EMSCO	2400	25,000
Westburne Drlg	69	dsl	1800	National 1320	1950	22,000
GILLETTE						
GCO Drlg	7	dsl	1750	National 75-CA	1500	13,000
GOSHEN						
True Drlg	18	dsl	350	EMSCO GB-250-T	350	6,500
HOT SPRINGS						
Anderson-Myers Drlg	4	dsl	1400	EMSCO GA-500	1200	11,000
Barnhart Drlg	3	dsl	600	Ideco H-35	350	5,500
Manning R L	16	gas-btne	675	National T-32	458	6,500
	24	dsl	860	Brewster N-75	860	11,000
JOHNSON						
Manning R L	6	dsl	1290	EMSCO GB-800	1290	14,000
Shelby Drlg	54-E	dsl-elec	1000	National 370-F	2000	20,000
LINCOLN						
Bomac Drlg	24	dsl	2600	National 100	2400	20,000
Brinkerhoff-Signal	8	NGB	900	M-CSCO U-40	900	11,000
Exeter Drlg Northern	28	dsl	1200	Gar-Den 800	1200	15,000
Loffland Bros	108	dsl	2160	Brewster N-12-A	2400	25,000
	30	dsl-elec	2160	M-CSCO 914-EC	2200	20,000
	60	dsl-elec	1800	M-CSCO U-712-A	2000	17,000
Manning R L	33	dsl-elec	1800	EMSCO C-1	1500	19,500/5"
Noble Drlg	132	dsl-elec	3300	National 1320-UE	3300	25,000
Parker Drlg	112	dsl	2700	Ideco 3000	2700	30,000
	163	dsl	1650	OIME 1500-P	1650	20,000
Roden J B Drlg	1	dsl	636	EMSCO GB-350	640	8,500
	3	dsl	1575	OIME 1500-SL	1575	19,000
Simmons Drlg	36	dsl	350	Hycalog HH-600	350	6,800
True Drlg	16	gas-LPG	1300	National 50-A	1000	11,000
	20	dsl	2100	National 125	2100	20,000
Westburne Drlg	56	dsl	750	EMSCO GC-500	950	12,000
NATRONA						
Dixilyn-Field Drlg	31	dsl-elec	2300	National 1320-UE	5000	25,000
	34	dsl-elec	3200	National 1320-UE	2500	25,000
Exeter Drlg Northern	39	dsl	500	M-CSCO U-15	750	9,500
Prairie Drlg	1	dsl	500	Ideco H-35	300	6,500
	2	dsl	450	EMSCO GB-160-T	300	5,000
Westburne Drlg	58	dsl	310	National T-32	275	7,000
NIOBRARA						
Harpel Drlg	5	dsl	1250	Brewster N-42	700	8,500
PARK						
Anderson-Myers Drlg	1	dsl	680	National T-32	450	7,000
Barnhart Drlg	2	dsl	600	National T-20	350	5,000
Manning R L	17	gas-btne	875	EMSCO GC-500	910	11,000
	28	gas-btne	800	EMSCO GB-350	488	7,500
Penrod Drlg	115	dsl	1600	National 1625-ME	3000	30,000
Roden J B Drlg	6		750	National CA-75	750	12,000
Wyoming Well Serv	21	dsl	500	Ideco H-35	318	5,000
	24	dsl	13000	Cardwell 200-A	318	4,500
	30	dsl	13000	Cardwell 200-A	318	4,500
SHERIDAN						
Parker Drlg	177	dsl	1300	OIME SL-1000-P	1300	15,000
SUBLETTE						
Anderson-Myers Drlg	3	dsl	1280	EMSCO GA-500	1200	11,000
Helmerich & Payne Intl Drlg	81	scr	2200	National 110-UE	1500	20,000
Loffland Bros	325	dsl	2160	Gar-Den 2100	2400	25,000
	97	dsl-elec	3300	M-CSCO U-1220-EB	3300	25,000

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
WYOMING						
SUBLETTE (Contd)						
Montgomery Drlg	31	dsl	2000	National 110-UE	2700	18,000
	32	dsl-elec	2700	National 110-UE	2000	18,000
Norton Drlg	6	dsl	550	Wilson 75	950	12,000
Roden J B Drlg	5	dsl	650	EMSCO GB-350	650	10,500
Viersen & Cochran Drlg	9	dsl	2150	National 110	2400	20,000
SWEETWATER						
Anderson-Myers Drlg	17	dsl	2300	National 110	2325	22,000
Atco Drlg	56	dsl-elec	1800	National 80-UE	1800	15,000
Brinkerhoff-Signal	26	dsl	1170	National 55	1170	10,500
Exeter Drlg Northern	11	dsl	700	Gar-Den 700	1000	12,500
Manning R L	20	dsl	1341	EMSCO J-1000	1341	14,000
	22	dsl	900	EMSCO A-550	1100	11,000
	29	dsl	800	EMSCO GB-500	860	9,000
	7	gas-btne	885	EMSCO G-500	756	8,500
Montgomery Drlg	48	dsl	2000	National 110	2000	20,000/5"
Pool Well Serv	66	dsl	300	Cabot/Franks 500	6000	5,500
Transcontinental Drlg	57	dsl	1400	Bethlehem M-810	1224	13,500
True Drlg	9	dsl	1200	M-CSCO U-40	1200	15,000
Viersen & Cochran Drlg	7	dsl	1700	M-CSCO U-712-A	1554	18,000
TETON						
Brinkerhoff-Signal	72	dsl	2000	National 1320-UE	2000	25,000
Rosamond Drlg	8	dsl	23250	National 130	2475	25,000
UINTA						
Anderson-Myers Drlg	12	dsl	2000		1500	17,000
Bomac Drlg	44	dsl	2000	Gar-Den 800	1800	16,000
Brinkerhoff-Signal	6	dsl	1500	Gar-Den 1100	1500	18,000
	73	dsl	1500	National 80-B	1500	15,000
Exeter Drlg Northern	24	dsl	1000	M-CSCO U-20	1500	15,000
	29	dsl	1200	Gar-Den 800	1200	15,000
	31	dsl	1000	Gar-Den 800	1500	15,000
Loffland Bros	184	dsl	2160	M-CSCO U-712-A	2400	15,000
WYOMING (Cont'd)						
UINTA (Contd)						
Loffland Bros	214	dsl	1860	M-CSCO U-40	1600	13,000
Lord Drlg	1	dsl	2200	OILWELL M-860	1650	18,000
Manning R L	21	dsl	1365	National 80-B	1365	15,000
	25	dsl	1180	Brewster N-75	1180	11,500
	31	dsl-elec	1550	EMSCO D-2	700	11,000
Noble Drlg	E-1101	dsl	2130	EMSCO A-1100	2130	18,000
	N-116	dsl	3000	National 110-UE	3000	20,000
Norton Drlg	8	dsl	550	Wilson 75	950	12,000
	171	dsl	4650	OIME 1500-P	1650	20,000
	173	dsl	1650	OIME 1500-P	1650	20,000
Transcontinental Drlg	41	dsl	2450	Gar-Den GD-1100	2742	18,000
Viersen & Cochran Drlg	14	dsl	2300	EMSCO 800-A	1554	18,000
Westburne Drlg	51	dsl	850	National Ideal 55	1050	12,500
WASHAKIE						
Anderson-Myers Drlg	11	dsl	1700	National 55	1200	13,000
	2	dsl	1600	National 55	1200	12,000
	9	dsl	1500	National 55	1200	12,000
Bomac Drlg	28	dsl	930	EMSCO G-500	930	10,500
Exeter Drlg Northern	19	dsl	700	Gar-Den 800	1100	14,000
	30	dsl	750	EMSCO D-2	1000	12,500
Manning R L	8	dsl	850	EMSCO GA-500	894	9,000
WESTON						
Atco Drlg	27	dsl	720	Bethlehem C-50	720	8,500
Cyclone Drlg	1	dsl	400	EMSCO GB-250	600	7,500
Exeter Drlg Northern	33	dsl	500	M-CSCO U-15	750	9,500
Farnsworth & Kaiser Drlg	1	dsl	900	M-CSCO U-15	900	8,000
	3	dsl	330	Joy 300	330	4,000
	6	dsl	450	M-CSCO U-34	450	6,500
Green Drlg	5	dsl	900	Unit Rig U-15	950	10,000
L & R Drlg	4		400	Cabot/Franks Rocket	195	3,000
Simmons Drlg	41	dsl	350	Hycalog HH-6000	350	6,800

Canadian Rotary Land Drilling Contractors

ADECO DRLG & ENGR CO LTD 505 Second St SW Calgary Alberta T2P 1N8 Canada 403-266-6291
ARGUS DRLG-DIV TARO INDS 1580-540 Fifth Ave SW Calgary Alberta T2P 0M3 Canada 403-264-3043
ARROWHEAD DRLG LTD 710 999 Eighth St SW Calgary Alberta T2R 1J5 Canada 403-245-2817
ATCO DRLG INC 1001-500 Fourth SW Calgary Alberta T2P 2V6 Canada 403-263-1215
BADGER DRLG LTD 1180 700 Fourth Ave SW Calgary Alberta T2P 3S4 Canada 403-269-8534
BALTIC DRLG LTD 901-7015 MacLeod Trail SW Calgary Alberta T2H 2K6 Canada 403-259-5213
BAWDEN PETER SERV LTD 2750 400 Fourth Ave SW Calgary Alberta T2P 1G7 Canada 403-265-1511
BEAVER DRLG LTD 1117 Sun Oil Bldg 500 Fourth Ave Calgary Alberta T2P 2V6 Canada 403-265-6472
BIRD DRLG 800 Lancaster Bldg Calgary Alberta T2P 1C2 Canada 403-264-1512
BLOCKER CANADA LTD 304 Sixth Ave SW Calgary Alberta T2P 0R4 Canada 403-233-0866
BOW ISLAND DRLG 700-800 Sixth Ave SW Calgary Alberta T2P 0T8 Canada 403-264-5413
BOW VALLEY INDUSTRIES LTD Box 6620 Postal Sta D 630 Sixth Ave SW Calgary Alberta T2P 2V8 Canada 403-231-1211
CACTUS DRLG LTD P O Box 1508 Calgary Alberta T2P 2L6 Canada 403-263-5670
CANTEX DRLG & EXPL LTD 1520 Royal Bank Bldg 335 Eighth Ave S Calgary Alberta T2P 1C9 Canada 403-265-8441
CAPRI DRLG LTD 314-540 Twelfth Ave SW Calgary Alberta Canada 403-261-5991
CENTENNIAL DRLG LTD 424 Tenth St NW Calgary Alberta T2N 1V9 Canada
CHALLENGER DRLG 220-444 Seventh Ave SW Calgary Alberta T2P 0X8 Canada 403-269-3121
CHALLENGER DRLG Box 5710 Station "L" Edmonton Alberta T6C 4G2 Canada 403-955-7788
CORUNNA PETR LTD P O Box 640 Corunna Ontario N0N 1G0 Canada 519-8[illegible]2-5505
GARNETT DRLG LTD 814-603 Seventh Ave SW Calgary Alberta T2P 2T5 Canada 403-262-7906
GOODLANDS DRLG LTD 203 Centurion Plaza 10335 172 St Edmonton Alberta T5S 1K9 Canada 403-483-3302
GUTHRIE MC LAREN DRLG LTD 14630 119th Ave Edmonton Alberta T5L 2P2 Canada 403-455-3191
HI TOWER DRLG Box 6650 Station D Calgary Alberta T2P 2V8 Canada 403-231-1211
JADE DRLG LTD 9816 B-44 Ave Edmonton Alberta T6E 5E5 Canada 403-437-2930
JOMAX DRLG LTD 9411 37 Ave Edmonton Alberta Canada T6E 5N4 Canada 403-265-5312
KENTING DRLG CO LTD 370 700 Sixth Ave SW Calgary Alberta T2P 0T8 Canada 403-263-2980
KISSINGER PETR LTD 540 Fifth Ave SW Suite 1420 Calgary Alberta T2P 0M2 Canada 403-265-2705
LACOMBE DRLG LTD 500 Fourth Ave SW Suite 1501 Calgary Alberta T2P 2V6 Canada 403-261-2040
LAREDO DRLG LTD 702 500 Fourth Ave SW Calgary Alberta T2P 2V6 Canada 403-262-0218
LEMKCO DRLG CO LTD 6767 Golden West Ave Red Deer Alberta T4P 1A7 Canada 403-342-4200
LOFFLAND BROS CO P O Box 2847 Tulsa OK 74101 918-622-9330
MONTGOMERY DRLG CANADA LTD 960-700 Fourth Ave SW Calgary Alberta T2P 3J4 Canada 403-232-1644
MUSTANG DRLG 1426 500 Fourth Ave SW Calgary Alberta T2P 2V6 Canada 403-263-8520
NABORS DRLG LTD 324 Eighth Ave SW 1107 Home Oil Tower Suite 1107 TD Square Calgary Alberta T2P 2Z2 Canada 403-263-6610
NUGGET DRLG LTD 8755 51 Ave Edmonton Alberta Canada 403-468-2133
PARKER DRLG CO 8 E Third St Tulsa OK 74103 918-585-8221
PRECISION DRLG LTD Suite 1204 500 Fourth Ave SW Calgary Alberta T2P 2V6 Canada 403-164-4882
RED ARROW DRLG LTD 520 304 Eighth Ave SW Calgary Alberta T2P 1C2 Canada 403-264-0695
REGENT DRLG LTD 12912 125th Ave Edmonton Alberta T5L 3C1 Canada 403-455-2121
ROCKY MOUNTAIN DRLG LTD 10333 Southfort Rd SW 415 Calgary Alberta T2W 3Y7 Canada 403-259-6767
S & T DRLG LTD 5825 98 St Edmonton Alberta T6E 3L4 Canada 403-437-1640
SARCEE DRLG DIV ATCO DRLG LTD 700-800 Sixth Ave SW Calgary Alberta T2P 2V6 Canada 403-263-5040
SHELBY DRLG LTD 2830 Security Life Bldg Denver CO 80202 303-629-7035
SIMMONS DRLG LTD 524-550 Sixth Ave SW Calgary Alberta Canada T2P 0S2 403-263-7686
THREE HUNDRED DRLG LTD 507 630 Eighth Ave SW Calgary Alberta T2P 1G6 Canada 403-266-1089
TRI CITY DRLG LTD 14305 120 Ave Edmonton Alberta T5L 2R8 Canada 403-453-3771
WESTBURNE DRLG CANADA LTD 200 535 Seventh Ave SW Calgary Alberta T2B 0Y4 Canada 403-233-6600
WORLDWIDE DRLG DIV 500 Fifth Ave SW Chevron Plaza Suite 300 Calgary Alberta T2P 3L5 Canada 403-261-5661

Canadian Contract Rotary Land Drilling Rigs

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
ALBERTA						
UNDESIGNATED						
Adeco Drlg & Engr	9	dsl	2000	OIME Helihoist 1500	2000	17,000
Atco Drlg	1	dsl	325	Ideco H-35-D	278	6,500
	10	dsl	400	Brewster N-45	400	7,500
	11	dsl	1500	National 55 Hercules	1500	11,500
ALBERTA (Cont'd)						
UNDESIGNATED (Contd)						
Atco Drlg	12	dsl	1950	National 80-B Hercules	1950	14,000
	14	dsl-elec	2200	National 1320 Hercules	2200	20,000
	16	dsl	500	EMSCO GA-350	556	7,500
	17	dsl	600	OILWELL 66	800	9,500

ALBERTA (Cont'd)

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
UNDESIGNATED (Contd)						
Atco Drlg	18	dsl	278	National T-32	278	6,500
	19	dsl	500	OILWELL 66	556	9,500
	20	dsl	650	EMSCO GA-500	652	9,500
	25	dsl	370	EMSCO GA-350	556	7,500
	3	dsl	500	National T-45	680	8,500
	4	dsl	1200	National 55 Hercules	1200	11,500
	5	dsl	325	National T-32	278	6,500
	59	dsl	1800	National 80-UE	1800	15,000
	6	dsl	526	Brewster N-45	556	8,000
	7	dsl	720	Ideco Super 750	720	10,500
	8	dsl	650	Ideco H-525	652	8,500
	9	dsl	400	National T-20	400	5,000
Baltic Drlg	1	dsl	870	Superior 700	600	9,000
	10	dsl	940	Superior 700	600	9,500
	14	dsl	800	National 50-AM	550	9,500
	24	dsl	300	National T-20	326	6,500/4"
	3	dsl	1000	Superior 700	600	9,500
	34	dsl	800	EMSCO GC-350	550	8,500
	4	dsl	1000	Superior 700	600	9,500
Bawden Peter Drlg Serv	1	dsl	1000	EMSCO GB-500	500	8,500
	14	dsl-scr	2600	National 1320-UE	2000	22,000
	16	dsl	1800	EMSCO D-3	1000	12,000
	17	dsl	850	Gar-Den 500	500	9,000
	18	dsl	2300	National 110-M	1500	16,000
	20	dsl	1000	Gar-Den 500	500	9,000
	25	dsl-scr	2000	EMSCO C-I Type II	1500	18,000
	33	dsl	1850	OILWELL 860	1400	18,000
	8	dsl-elec	2200	OILWELL 860	1400	20,000
Beaver Drlg	1	dsl	300	National T-32	300	7,000
	2	dsl	300	National T-20	300	6,000
	3	dsl	300	National T-20	300	6,000
	4	dsl	300	National T-32	300	7,000
	5	dsl	300	National T-32	300	7,500
	6	dsl	300	National 370	550	8,500
	7	dsl	550	National 370	550	9,500
	8	dsl	300	National T-32	300	7,000
	9	dsl	550	National 370	550	9,500
Blocker Canada	1	dsl	2000	OIME 1500-SL	1500	18,000
	10	dsl	1000	OIME 5-D3	770	10,000
	2	dsl	2000	OIME 1000-SL	1500	16,000
	3	dsl	1500	OIME 750-SL	1155	12,000
	4	dsl	1500	OIME 750-SL	1155	12,000
	5	dsl	1550	Brewster N-75	1425	12,000
	7	dsl	1500	OIME 750-SL	1155	12,000
	8	dsl	1600	OIME 750-SL	1155	12,000
	9	dsl	1600	OIME 750-SL	1155	12,000
Bow Valley Inds	71	dsl	240	Failing 2500	175	3,000
	77	dsl	320	Failing 2500	240	3,000
	79	dsl	300	Gar-Den 3000	240	4,000
	80	dsl	375	Shaffer	350	6,000
	81	dsl	375	Superior 400	318	5,000
	82		375	Superior 300	263	4,500
	83	dsl	300	Cardwell 150-A	280	
	84	dsl	300	Superior 300	290	4,500
	85		300	Superior 300	290	4,500
	86	dsl	300	Kremco K-600-D	350	4,500
	87	dsl	300	Cardwell Model L	350	4,500
	88	dsl	350	Cardwell S-350	350	5,500
	89	dsl	330	Ideco H-30-D	330	4,000
	90	dsl	300	M-CSCO U-34-D	330	5,500
	91	dsl	330	EMSCO GB-250	360	6,500
	92	dsl	300	Cardwell S-350	240	4,500
	93	dsl	300	Cardwell AT-150 Double Drum	200	3,500
	94	dsl	300	Cardwell Model L	280	4,500
	95	dsl	300	Cardwell AT-150 Double Drum	200	3,500
	96	dsl	300	Ideco H-25 Double Drum	240	4,500
	97	dsl	300	National T-32	300	6,500
	98	dsl	330	National T-20	330	6,000
	99	dsl	330	EMSCO GA-250	300	6,500
Can-Tex Drlg & Expl	10	dsl	400	Cardwell J-450	450	7,000
	5	dsl	1200	EMSCO GB-800	12000	12,000
	6	dsl	1400	EMSCO GB-80083	1275	14,000
	7	dsl	900	EMSCO G-50052	900	10,000
	8	dsl	820	OILWELL 66	820	9,000
Capri Drlg	1	dsl	300	Ideco H-25	330	6,000
	2	dsl	300	Ideco H-25	330	6,000
	3	dsl	300	Ideco H-25-D	330	6,500
	5	dsl	700	National T-32	700	8,500
	6	dsl	850	National 50-A	1365	10,000
	7	dsl	200	TSM-3000	250	3,000
Centennial Drlg	1	dsl	300	National T-12	300	4,500
	2	dsl	300	EMSCO 250	300	5,000
	3	dsl	300	National T-32	300	7,000
Garnett Drlg	10	dsl	1400	National 610	900	11,000
	3	dsl	900	Cardwell J-700	900	11,000
	5	dsl	900	Brewster N-55	900	11,000
	6	dsl	1100	M-CSCO U-40	900	11,000
	7	dsl	1600	National 610	1200	12,000
	9	dsl	1200	Brewster N-7	900	11,000
Hi Tower Drlg	1	dsl-elec	2800	National 1320-UE	1400	20,000

ALBERTA (Cont'd)

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
UNDESIGNATED (Contd)						
Hi Tower Drlg	10	dsl	1200	OILWELL 76	1200	12,000
	16	dsl	1220	M-CSCO U-40	1220	12,500
	17	dsl	650	National 50-A	340	7,000
	2	dsl	900	OILWELL 66	600	8,500
	20	dsl-elec		760	2400	2,400
	3	dsl	1020	OILWELL 66	1020	10,000
	4	dsl-elec	3400	OILWELL E-2000	2000	20,000
	7	dsl	1000	OILWELL 66	1000	10,000
Jade Drlg	1	dsl	230	Wilson Super 38	185	3,500
	2	dsl	230	Wilson Super 38	185	3,500
	3	dsl	380	Ideco H-25	380	5,900
	4	dsl	500	Ideco H-25	430	7,000
Jomax Drlg	1	dsl	800	OILWELL 52-T	455	2,750
	2	dsl	300	OILWELL 52-T	455	2,600
	4	dsl	1200	OILWELL 76-700A	1275	4,300
	5	dsl	875	National JI-65	875	10,500
	6	dsl-elec	2400	OILWELL 760	1600	5,000
	7	dsl-elec	2400	OILWELL 760	1600	5,000
Kissinger Petr Corp	1	dsl	500	Cardwell J-450	500	7,000
	1	dsl	318	Cardwell J-450	318	6,500
	3	dsl	100	National T-8	220	2,500
	4	dsl	300	National T-12	300	4,500
Lacombe Drlg	80	dsl	1800	National 80-B	1500	15,000
Laredo Drlg	1	dsl	300	Mac-300	300	2,000
	2	dsl	300	Mac-300	300	2,000
	3	dsl	300	National T-8	1500	1,000
	4	dsl	300	Mac-300	300	2,000
	5	dsl	300	Mac-300	300	2,000
	6	dsl	300	Mac-300	300	2,000
Loffland Bros	171	gas	2132	M-CSCO U-014-B	1700	18,000
	198	dsl	1400	M-CSCO U-914-A	1599	15,000
	221	dsl	2880	M-CSCO U-1220-AE	3200	25,000
	36	dsl	2000	M-CSCO U-914-C	2880	20,000
	89	dsl-elec	2100	M-CSCO U-1220-EB	2400	25,000
	93	dsl-elec	2100	M-CSCO U-1220-EB	2400	25,000
Montgomery Drlg Canada	42	dsl-elec	2000	National 110-UE	2000	20,000
	46	dsl-elec	2000	National 1320-UE	2000	20,000/5"
	49	dsl-elec	2000	National 110-E	2000	20,000
Mustang Drlg	10	dsl	652	Brewster N-45	326	8,500
	11	dsl	1200	National 55	1200	12,000
	14-UE	dsl-elec	3000	National 1320-UE	3000	22,000
	16-UE	dsl-elec	2745	National 110-UE	2745	2,000
	17-E	dsl-elec	1600	National	1600	12,000
	2	dsl	1845	National 80-B	1845	15,000
	6	dsl	1230	EMSCO A-550	1230	12,000
	9-UE	dsl-elec	2745	National 110-UE	2745	20,000
Nabors Drlg	10	dsl	970	National 50-A	770	10,000
	11	dsl	1070	National 50-CA	770	8,500
	12	dsl	1200	OILWELL 66	884	11,000
	14-E	dsl-elec	1714	EMSCO D-3	2925	15,000
	15	dsl	1200	EMSCO A-550	884	11,000
	16	dsl	2000	EMSCO A-800	1740	15,000/5"
	19-E	dsl-elec	2000	EMSCO C-I	3900	20,000/5"
	2	dsl	1195	OILWELL 76	1326	12,000
	20	dsl	2000	National 110	3480	20,000/5"
	23-E	dsl-elec	1600	EMSCO D-2	1800	14,000
	24-E	dsl-elec	2000	EMSCO Electro-hoist 2-C	2925	14,000
	3	dsl	1700	OILWELL 76	1326	14,000
	4	dsl	2000	OILWELL 76	1740	14,000
	7	dsl	1200	National 55	770	11,000
Parker Drlg	98	dsl	1500	National 100	1950	17,000
Precision Drlg	1	dsl	350	Ideco H-30-FD Super	350	6,500
	10	dsl	350	Ideco H-35-D	350	7,200
	11	dsl	350	Ideco H-40-PD	350	7,200
	12	dsl	500	Ideco H-35-D	350	7,200
	14	dsl	350	Ideco H-40	500	7,200
	15	dsl	350	Ideco H-30-FD	350	7,200
	2	dsl	350	Ideco H-20-AD	350	4,500
	3	dsl	350	Ideco H-30 Super 2-FD	350	6,500
	4	dsl	350	Ideco H-35-D	350	7,200
	5	dsl	350	Ideco H-525-D	350	7,500
	6	dsl	350	National T-20	350	5,500
	7	dsl	350	Ideco H-35-D	500	7,000
	8	dsl	350	Ideco H-30-D	350	5,500
	9	dsl	350	Ideco H-35-D	350	7,200
Red Arrow Drlg	1	dsl	225	National T-20	275	6,000
	10	dsl	225	RAD 200	275	1,850
	11		225	RAD 200	275	6,000
	12	dsl	225	RAD 200		1,850
	2	dsl	225	National T-12	275	5,000
	3	dsl	225	National T-20	275	6,000
	4	dsl	225	National T-20	275	6,000
	5	dsl	225	National T-20	275	6,000
	6	dsl	225	RAD 200	275	6,000
	7	dsl	225	RAD 200	275	6,000
	8	dsl	225	RAD 200	275	6,000
	9		225	RAD 200	275	6,000
Sarcee Drlg	1	dsl	300	Ideco HD-25	230	5,000
	10	dsl	300	Ideco H-30-F	259	5,500
	11	dsl	350	Ideco H-30-F	259	5,500
	12	dsl	350	Ideco H-35	259	7,500
	14	dsl	360	Ideco H-35-D	350	7,500

ALBERTA (Cont'd)

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
UNDESIGNATED (Contd)						
Sarcee Drlg	2	dsl	300	Brewster N-4	224	5,500
	3	dsl	300	National T-20	224	5,500
	4	dsl	300	National T-20	224	5,500
	5	dsl	300	Brewster N-4	224	5,500
	6	dsl	300	Ideco H-30-AD	230	5,500
	8	dsl	250	National T-12	230	5,000
	9	dsl	250	National T-20	230	5,500
Simmons Drlg	1!	scr-elec	350	Hycalog HH-6000	350	6,500
	12	dsl-elec	1200	Gar-Den 500-E	700	9,000
	15	dsl	350	EMSCO U-34	350	600
	7	dsl	350	Hycalog HH-6000	350	6,800
	8	dsl	350	Hycalog HH-600	350	6,800
ALDER FLATS						
S & T Drlg	4	dsl	600	National 50-CA	400	8,000
ALEXANDER						
Adeco Drlg & Engr	1	dsl	308	National T-20	320	1,680
BAPTISTE						
Westburne Drlg Canada	37	dsl	350	Gar-Den 2500	170	3,500
BASELINE						
Adeco Drlg & Engr	8	dsl	1500	National 100-M	2340	18,000
BEAVERLODGE						
Arrowhead Drlg	C-10	dsl	1560	National 80-B	1560	15,000
	C-9	dsl	1040	National 610	1040	12,000
BISTCHO						
Adeco Drlg & Engr	18	dsl	700	OIME Helihoist 500-C	1370	23,000
BONNYVILLE						
Tri-City Drlg	6	dsl	250	Failing 2500	210	3,000
Worldwide Drlg	1	dsl	456	Failing 2500	304	3,000/3½"
BOW ISLAND						
Cactus Drlg	8	dsl	350	M-CSCO U-34	350	6,500
BRAGG CREEK						
Challenger Drlg	50	dsl	2000	National 110	2385	19,000
BRAZEAU RIVER						
Mustang Drlg	18-UE		1800	National 80-UE	1000	14,000
Regent Drlg	25	dsl	1400	Brewster N-75	1400	14,000
	28	dsl	1400	Brewster N-75	1400	14,000
BROOKS						
Shelby Drlg	3	dsl	360	Cabot/Franks Rocket III	450	6,000
	5	dsl	360	Cooper 42x12 550 Oiler	450	6,500
	7	dsl	360	Cooper 32-32	225	3,000
BUFFALO						
Westburne Drlg Canada	38	dsl	310	Failing 2500	160	3,000
CADOTTE						
Challenger Drlg	11	dsl	350	National T-20	456	7,500
CAROLINE						
Kenting Drlg	23	dsl-elec	2000	National 610-E	1000	11,500
	27	dsl	1040	National 610	1040	11,500
	29	dsl	1040	National 610	1040	11,500
Mustang Drlg	15-E	dsl-elec	1600		1600	12,000
Regent Drlg	14-E	dsl	2800	OILWELL 840-E	1800	20,000
CARROT CREEK						
Adeco Drlg & Engr	15	dsl	365	National T-45	575	10,500
CLARESHOLM						
Nugget Drlg	5	dsl	2000	National 55-M	2000	12,000
CLAYHURST						
Westburne Drlg Canada	22	dsl	1010	National 50-A	700	8,500
CONSORT						
Bow Island Drlg	10	dsl	278	Walker-Neer 2000	278	3,000/3½"
CREEK						
Adeco Drlg & Engr	2	dsl	380	OIME SD-3	365	8,500
CROSSFIELD						
S & T Drlg	5	dsl	1200	National 50-A	800	9,500
	7	dsl	1200	National T-45	800	9,500
CZAR						
Tri-City Drlg	2	dsl	300	M-CSCO U-34	3000	6,000
DRUMHELLER						
Cactus Drlg	3	dsl	350	M-CSCO U-34	350	6,500
EDGERTON						
Bow Island Drlg	1	dsl	278	Walker-Neer 2000	278	3,000/3½"
EDMONTON						
Adeco Drlg & Engr	5	dsl	2000	OIME Split Level 1500	2000	17,000
Arrowhead Drlg	C-7	dsl	1040	National 610	1040	12,000
Badger Drlg	5	dsl		National 370	700	8,500
Guthrie McLaren Drlg	5	dsl	375	National 50-CA	400	8,500
	7	dsl	300	National T-32	300	7,000/3½"
	8	dsl	300	Failing 2500-A	225	3,000
Three Hundred Drlg	Mr Nelson	dsl	900	National 370-M	900	9,500

ALBERTA (Cont'd)

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
EDSON						
Arrowhead Drlg	C-11	dsl	1560	National 80-B	1560	15,000
Cactus Drlg	1	dsl	750	Brewster N-55	750	8,500
	7	dsl	700	EMSCO GB-350	700	8,500
Challenger Drlg	55	dsl	1180	National 100-HD	1470	16,500
Guthrie McLaren Drlg	4	dsl	375	Dreco D-500	450	6,000
Rocky Mountain Drlg	1	dsl	650	National 370	650	8,500
S & T Drlg	3	dsl	1200	National 55	1200	11,500
Shelby Drlg	8	dsl	1200	OIME 750-SL	1200	14,000
ELMWORTH						
Mustang Drlg	8-E	dsl-elec	1600	National 610-E	1600	12,000
ENTWISTLE						
Guthrie McLaren Drlg	11	dsl	450	Dreco 500	450	7,000
FALHER						
Guthrie McLaren Drlg	10	dsl	300	Superior D-500	450	7,000/3½"
FAWCETT						
Westburne Drlg Canada	15	dsl	900	Brewster N-7	600	8,500
FOX CREEK						
Challenger Drlg	5-E	dsl-elec	1220	National 55	1830	12,500
Kenting Drlg	11	dsl	1200	M-CSCO U-40	1200	14,000
	18	dsl	800	National 50-A	800	9,500/5"
Regent Drlg	10	dsl	780	Brewster N-7	560	9,500
	22	dsl	560	M-CSCO U-36-A	500	8,500
FT MC LEOD						
Regent Drlg	23	dsl	840	Brewster N-7	560	9,500
GOODWIN						
Challenger Drlg	45	dsl	2050	National 100-HD	2925	18,000/5"
GORDONDALE						
Cactus Drlg	21	dsl	900	EMSCO GC-500	900	11,500
GRANDE PRAIRIE						
Arrowhead Drlg	C-5	dsl	1560	National 80-B	1560	15,000
Blocker Canada	6	dsl	1550	OIME 1000-SL	1500	16,000
Cactus Drlg	17	dsl	500	Unit 34	500	6,500
Challenger Drlg	6-E	dsl-elec	1500	National 80-E	2250	14,500/5"
	8-E	dsl-elec	1500	National 80-E	2250	14,500/5"
	JB-9E	scr-elec		National 80-UE	2600	15,000/5"
Kenting Drlg	7	dsl	720	EMSCO GC-500	720	10,500
	15	dsl	720	National 370	720	8,000
	24	dsl	350	National 370	350	9,000
Nugget Drlg	1	dsl	1500	National 610	1000	12,000
	6	dsl	1000	National 55-M	1000	12,000
	7	dsl	1000	National 610	1000	12,000
Regent Drlg	16-E	dsl	2700	Gar-Den 800-E	1000	14,000
	17-E	dsl	2700	Gar-Den	1000	14,000
Three Hundred Drlg	Mr Gary	dsl	1200	Superior 700	785	9,500
Westburne Drlg Canada	24	dsl	360	National T-32	360	7,000
	28	dsl	960	National 55	960	11,000
HANNA						
Cactus Drlg	4	dsl	350	M-CSCO U-34	350	6,500
Guthrie McLaren Drlg	12	dsl	325	Superior S-400	300	5,000
Jade Drlg	5	dsl	500	Ideco H-30	420	7,000
Shelby Drlg	2	dsl	360	Cooper 42-12 300 Oiler	350	5,500
HARMATTAN						
Kenting Drlg	9	dsl	720	National T-32	720	7,500
HIGH PRAIRIE						
Regent Drlg	5	dsl	840	Brewster N-7	560	9,500
HINTON						
Kenting Drlg	3	dsl	1000	EMSCO GC-500	1000	12,000
	4	dsl	720	610	720	11,500
Regent Drlg	15-E	dsl	3200	Gar-Den 1500	2000	21,000
Rocky Mountain Drlg	3	dsl	1650	National 80	1650	15,000
S & T Drlg	11	dsl	1300	Unit 20	1300	12,000
Westburne Drlg Canada	1	dsl	1560	National 80-B	1560	13,000
HUGHENDEN						
Tri-City Drlg	3	dsl	250	Failing 2500	200	3,000
HUNTER VALLEY						
Regent Drlg	11	dsl	2200	OILWELL 840-E	2592	20,000
INDUS						
Badger Drlg	2	dsl	400	National 370	500	7,200
INNISFAIL						
Argus Drlg Div Taro Inds	7	dsl	320	National T-32	327	8,000
KAKWA						
Kenting Drlg	14	dsl	1500	National 80-B	1500	14,500/5"
Mustang Drlg	3	dsl	726	National T-45	620	9,000
KILLAM						
Westburne Drlg Canada	50	dsl	240	Failing 2500	180	3,000
LACOMBE						
Cactus Drlg	10	dsl	700	National T-32	700	7,800
Three Hundred Drlg	Mr Nick	dsl	1200	Superior 700	785	9,500
LAMONT						
Goodlands Drlg	1	dsl	350	Failing Strat 100	350	5,000

ALBERTA (Cont'd)

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
LAMONT (Contd)						
Tri-City Drlg	8	dsl	300	Failing 3500	280	3,500/3½"
LEDUC						
Adeco Drlg & Engr	12	dsl	312	National T-32	320	2,200
LEGAL						
Westburne Drlg Canada	42	dsl	360	National T-20	360	5,500
LINDBURGH						
Westburne Drlg Canada	33	dsl	310	Failing 3500	160	3,500
LLOYDMINSTER						
Guthrie McLaren Drlg	6	dsl	3000	Failing 2500-A	225	3,000/3½"
Kenting Drlg	35	dsl	350	National T-12	330	5,000
Tri-City Drlg	4	dsl	300	Failing Stratmaster 90	280	5,000/3½"
Westburne Drlg Canada	39	dsl	310	Failing 3500	235	3,500
LODGEPOLE						
Guthrie McLaren Drlg	9	dsl	1940	OIME 1500	1940	18,000/5"
MANNING						
Challenger Drlg	44	dsl	1300	National 80-B	1950	15,000/5"
MEDICINE HAT						
Bow Island Drlg	3	dsl	278	Walker-Neer 2000	278	3,000/3½"
	8	dsl	278	Walker-Neer 2000		3,000/3½"
Westburne Drlg Canada	35	dsl	310	Failing 2500	160	3,000
MINBURN						
Bow Island Drlg	2	dsl	278	Walker-Neer 2000	278	3,000/3½"
MUSKEG						
Challenger Drlg	51	dsl	1630	National 110	1980	19,000/5"
MUSKEG RIVER						
Westburne Drlg Canada	3	dsl	1560	OILWELL 860	1560	18,000
NANTON						
Arrowhead Drlg	C-8	dsl	1040	National 610	1040	12,000
Kenting Drlg	32	dsl-elec	3720	National 110-UE	2000	16,000
NISKU						
Bow Island Drlg	11	dsl-elec	300	Walker-Neer	1287	5,000
Kenting Drlg	16	dsl	350	M-CSCO U-34	350	6,500
	5	dsl	350	National T-20	350	5,500
OKOTOKS						
Arrowhead Drlg	C-4	dsl	1040	National 610	1040	12,000
Mustang Drlg	4	dsl	1200	National 55	1200	12,000
OYEN						
Westburne Drlg Canada	34	dsl	360	Ideco HD-25	360	4,500
PEACE RIVER						
Westburne Drlg Canada	13	dsl	600	EMSCO GA-350	600	8,000
PEERS						
Westburne Drlg Canada	10	dsl	1275	National 80	1275	13,000
PEMBINA						
Badger Drlg	4	dsl	400	Superior 400	400	5,500
Bawden Peter Drlg Serv	21	dsl	2000	EMSCO C-1	1500	18,000/5"
Kenting Drlg	22	dsl-elec	2000	National 80-UE	1000	13,000
S & T Drlg	10	dsl	350	Unit 34	350	6,000
PINCHER CREEK						
Regent Drlg	9	dsl	1400	Brewster N-75	1400	14,000
PONOKA						
Cactus Drlg	14	dsl	750	EMSCO GB-500	750	8,000
Regent Drlg	29	dsl	300	Brewster N-4	365	6,000
RAINBOW LAKE						
Badger Drlg	3	dsl		Kremco 1000	900	11,000
RED DEER						
Adeco Drlg & Engr	3	dsl	308	National T-32	320	1,985
Argus Drlg Div Taro Inds	3	dsl	320	M-CSCO U-34	319	6,000
RIMBEY						
Argus Drlg Div Taro Inds	1	dsl	320	National T-32	327	7,000
ROCKY MOUNTAIN HOUSE						
Cactus Drlg	15	dsl	750	EMSCO GC-350	750	6,500
	26-E	dsl-elec	2700	EMSCO D-3	500	18,000
	5	dsl	1554	Ideco Super 711	1554	15,000
Challenger Drlg	10-E	scr-elec	2600	Unit 1220-EB	2800	22,000
SCHULER						
Westburne Drlg Canada	40	dsl	310	Failing 2500	175	3,000
SEXSMITH						
Cactus Drlg	24	dsl	300	Bethlehem 55	300	6,000
SLAVE LAKE						
Regent Drlg	1	dsl	320	Ideco H-40	280	7,500
Westburne Drlg Canada	8	dsl	360	Ideco H-40-D	360	7,000
SMOKY LAKE						
Bow Island Drlg	9	dsl	278	Walker-Neer 2000	278	3,000/3½"
Tri-City Drlg	7	dsl	250	Failing 2500	210	3,000
SPIRIT RIVER						
Regent Drlg	27	dsl	560	Brewster N-4	280	6,500
SPRUCE VIEW						
Arrowhead Drlg	C-6	dsl	770	National 370	770	9,000

ALBERTA (Cont'd)

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
STETTLER						
Argus Drlg Div Taro Inds	2	dsl	320	EMSCO 250-T	327	6,500
STURGEON LAKE						
Adeco Drlg & Engr	14	dsl	312	National T-32	320	7,200
SUFFIELD						
Bow Island Drlg	6	dsl	278	Walker-Neer 2000	278	3,000/3½"
	7	dsl	278	Walker-Neer 2000	278	3,000/3½"
SUNDRE						
Cactus Drlg	2	dsl	940	National 55	940	11,500
	25-E	dsl-elec	3400	EMSCO C-2	2000	20,000
Regent Drlg	21	dsl	2200	OILWELL M-2000	2592	20,000
TABER						
Cactus Drlg	16	dsl	500	Unit 34	500	6,500
	9	dsl	350	M-CSCO U-34	350	6,500
Shelby Drlg	1	dsl	360	Cooper TC 42x12	365	5,500
THREE HILLS						
S & T Drlg	2	dsl	350	National T-32	350	7,000
TINDISTOLL						
Adeco Drlg & Engr	16	dsl	308	National T-32	312	7,000
TWO HILLS						
Tri-City Drlg	1	dsl	250	Failing 2500	200	3,000
VALHALLA						
Kenting Drlg	28	dsl	700	National 370	700	9,000
VALLEYVIEW						
Argus Drlg Div Taro Inds	5	dsl	1100	OILWELL 76	1326	11,800
Cactus Drlg	6	dsl	900	Cardwell A0	900	9,500
Guthrie McLaren Drlg	2	dsl	300	Brewster N-4	300	6,500
Rocky Mountain Drlg	2	dsl	1150	Gar-Den 500	700	8,500
VEGREVILLE						
Badger Drlg	1	dsl	300	Ideco H-30	250	5,000
VERMILION						
Tri-City Drlg	5	dsl	250	Failing 2500	210	3,000
VIRGINIA HILLS						
Regent Drlg	24	dsl	840	Brewster N-7	560	9,500
VULEAN						
Cactus Drlg	11	dsl	350	M-CSCO	350	6,500
WAINWRIGHT						
Tri-City Drlg	9	dsl	300	Dreco 300	300	4,500
WATERTON						
Regent Drlg	8	dsl	1800	Gar-Den 1100	2100	15,000
WETASKIWIN						
Argus Drlg Div Taro Inds	4	dsl	320	M-CSCO U-34	319	6,000
WILDWOOD						
Rocky Mountain Drlg	4	dsl	1050	Unit U-36-A	1050	10,000
WILLESDEN GREEN						
Adeco Drlg & Engr	17		690	OIME S/L 750	1035	12,000
Kenting Drlg	33	dsl-elec	1000	Superior 700-E	700	9,000
WORSLEY						
Challenger Drlg	15	dsl	800	Ideco Sup 7-11	1300	12,500
	4-E	dsl-elec	1170	National T-45	1005	9,000

BRITISH COLUMBIA

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
UNDESIGNATED						
Baltic Drlg	12	dsl	525	National T-32	326	7,500
	2	dsl	1600	National 80-B	1850	15,000
	25	dsl	475	National T-20	326	6,500/4"
Garnett Drlg	8	dsl	300	OILWELL 52-T	400	6,000/4"
Hi Tower Drlg	11	dsl	700	M-CSCO U-34	350	6,000
	12	dsl	570	National T-32	310	6,000
	14	dsl	370	OILWELL 52-T	280	6,500
	15	dsl	580	National T-32	310	6,000
	18	dsl-elec	2400	OILWELL 760	2400	15,000
	19	dsl	580	OILWELL 52-T	350	6,500
	9	dsl	880	National 50-A	600	8,500
Jomax Drlg	3	dsl	800	OILWELL 52-T	450	2,600
Loffland Bros	3	dsl	1850	M-CSCO U-914-A	2880	18,000
	72	dsl	1700	M-CSCO U-914	2880	18,000
	9	dsl	2000	M-CSCO U-914	1980	20,000
Montgomery Drlg Canada	43	scr	2000	National 110-UE	2000	20,000
Nabors Drlg	21-E	dsl-elec	3200	EMSCO II-C	3900	20,000/5"
	5	dsl	700	OILWELL 76	1326	12,000
	6	dsl	300	Ideco H-35	300	6,000
	8	dsl	740	EMSCO GA-500	770	8,500
	9	dsl	2250	National 110	2400	18,000/5"
Parker Drlg	122-HH/11	dsl	1500	OIME TBA-1500	1700	17,000
	94	dsl	1700	National 100-M	1500	18,000
BIRCH ISLAND						
Westburne Drlg Canada	26	dsl	360	National T-32	360	7,000
BOUNDARY LAKE						
S & T Drlg	9	dsl	800	National 370	800	8,500
CHETWYND						
Arrowhead Drlg	C-2	dsl	770	National 370	770	9,000

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
BRITISH COLUMBIA (Cont'd)						
CHETWYND (Contd)						
Challenger Drlg	1	dsl	1200	EMSCO GC-500	1300	12,500
Mustang Drlg	7-UE	dsl-elec	2400	National 80-UE	2400	15,000
FERNIE						
Challenger Drlg	22	dsl	1630	National 110	1980	19,000/5"
FORT NELSON						
Regent Drlg	2	dsl	840	Brewster N-55	560	9,500
	3	dsl	840	Brewster N-7	560	9,500
FORT ST JOHN						
Challenger Drlg	2	dsl	650	National T-45	608	9,000
	39	dsl	350	National T-20	456	5,750
Kenting Drlg	1	dsl	1500	National 80-B	1500	14,500/5"
Regent Drlg	26	dsl	280	Ideco H-40	280	7,500
	30	dsl	280	Brewster N-4	280	6,500
Three Hundred Drlg	Mr Digger	dsl	900	National 370-M	900	9,500
Westburne Drlg Canada	14	dsl	1080	National 50-A	1080	9,500
	17	dsl	1080	EMSCO GB-350	720	8,000
	4	dsl	1040	EMSCO GC-500	1040	11,000
GAYLORD						
Adeco Drlg & Engr	6	dsl	1500	National 100-M	2340	18,000
KAHNTAH						
Kenting Drlg	10	dsl	720	OILWELL 66	720	10,000
MOBERLY						
Mustang Drlg	5	dsl	946	National T-45	620	9,000
PROPHET RIVER						
Regent Drlg	4	dsl	840	Brewster N-7	560	9,500
THIENDER MOUNTAIN						
Regent Drlg	12-E	dsl	2200	Gar-Den 1500	2592	20,000
WHITCOURT						
Nugget Drlg	8	dsl	1100	National T-45	600	10,000
MANITOBA						
WINNIPEG						
Goodlands Drlg	2	dsl	200	Futros	300	4,000
NORTHWEST TERRITORIES						
UNDESIGNATED						
Adeco Drlg & Engr	4	dsl	1380	OIME Helihoist 1500	2000	17,000
NORTHWEST TERRITORIES (Cont'd)						
UNDESIGNATED						
Parker Drlg	99-HH/6	dsl	1500	OIME Helihoist 1500	1700	17,000
HAY RIVER						
Mustang Drlg	12	dsl	1845	National 80-B	1845	14,000
ONTARIO						
LAMBTON						
Corunna Petr	2	dsl	475	Ideco 525	636	8,500
	3	dsl	950	Hooper GXXTA	700	5,500
QUEBEC						
GASPE						
Regent Drlg	6	dsl	1400	Brewster N-75		
SASKATCHEWAN						
UNDESIGNATED						
Bird Drlg	1	dsl	350	Ideco	350	6,500
	6	dsl	350	EMSCO 250	500	7,000
Bow Island Drlg	17	dsl	278	National T-12	278	5,000
	18	dsl	278	Unit U-34	278	5,000
Capri Drlg	4	dsl	250	National T-12	330	4,000
Sarcee Drlg	7	dsl	250	Unit U-34	230	5,000
Simmons Drlg	14	dsl	575	Troy M-500	535	7,500
	2	dsl	350	OILWELL 52-T	350	6,500
	4	dsl	350	OILWELL 52-1	350	6,000
ASSINIBOIA						
Three Hundred Drlg	Mr Jim	dsl	1200	National 370-M	900	9,500
CATHKIN						
Bow Island Drlg	12	dsl-elec	300	Cabot/Franks 1287	450	5,000
CLARESHOLM						
Mustang Drlg	1	dsl	930	Unit 36-A	800	8,500
LASHBURN						
Bow Island Drlg	4	dsl	278	Walker-Neer 2000	278	3,000/3½"
	5	dsl	3000	Walker-Neer 2000	278	/3½"
MARSDEN						
Westburne Drlg Canada	32	dsl	300	Failing 2500	210	3,000
WILBERT						
Westburne Drlg Canada	31	dsl	160	Failing 2500	275	3,000

International Rotary Land Drilling Contractors

ALADDIN-MIDDLE EAST LTD 809 Petroleum Club Bldg Wichita KS 67202 316-265-9602
ARAB DRLG & WORKOVER CO P O Box 1401 Orange CA 92668 714-558-1300
ASTRAFOR SAIC Tucuman 117 8 Piso Buenos Aires Argentina
BAWDEN DRLG INTL LTD JL LT Jen M T Haryond 58 Jakarta Selatan Indonesia 586603
BELCO PETROLEUM CORP One Dag Hammarskjold Plaza New York NY 10017 212-644-2200
BLOCKER INTL 800 Berring Dr Suite 400 Houston TX 77057 713-972-2030
BOLDON DRLG LTD Cleadon Lane E Boldon Tyne & Wear England 0783-368418
CHALLENGER LTD 4 Bicaniou Square Glyfada Athens Greece
COMPANIA GEN DE SONDEOS SA Corazon Demaria No 15 Madrio Victoria Span 4-16-85-50
CONSTRUCTORA Y PER LATINA SA Paseo De La Reforma 243-70PIS Mexico 5 DF Mexico
CONTINENTAL DRLG & DEV 5-7 VRSS Constantinou Athens Greece
COSIFOR 90 Ave Des Ternes 75017 Paris France (1) 579 35 79
DEUTSCHE TIEFBOHR AG Postfach 75 4444 Bentheim West Germany 05922/721
DRILCON INC 815 N Central Expwy Suite 1255 Campbell Centre II Dallas TX 75206 713-780-8772
EGYPTIAN DRLG CO P O Box 71 Nasr City Cairo Egypt 600230
FORAMINES 55 Rue De Chateaudun 75009 Paris France
FORASOL 16 Bis Rue Grange Dame Rose 78 140 Velizy Villacoublay France (3) 946-97-17
FOREX-NEPTUNE &/OR AFFILIATES 20 Ave Rapp BP 111 07 75326 Paris Cedex 07 France 555-95-34
GEOPROSCO INTL LTD P O Box 938 Abu Dhabi United Arab Emirates 0534 35521
HELMERICH & PAYNE CA Anaco Endo Apartado 16 Anzoategul Venezuela 22691
HELMERICH & PAYNE (COLUMBIA) DRLG CO Apartado Aerco Bogota Columbia 55088 2484249
HELMERICH & PAYNE DEL ECUADOR INC 1647 Orellana Box 4623-A Quito Ecuador 231-546
HELMERICH & PAYNE (GUATEMALA) DRLG CO 15 Avenida 16-66 Zone 13 Guatemala City Guatemala 66008
HELMERICH & PAYNE RASCO INC Bolivia Branch KM-3 Carretera A Cochabamba Casilla 3298 Bolivia 28478
HOULDER MARINE DRLG LTD 53 Leadenhall St London EC3A 2BR England
INTERNATIONAL DRLG CO SA P O Box 2765 Houston TX 77063 713-871-7500
ITAG-CELLE P O Box 114 3100 Celle West Germany
KCA DRLG LTD 9th Floor Berkeley House London WI England 491-3956
KENTING DRLG SERV LTD Unit #6 Ruddington Lane Wilford Nottingham NG11 7BY England 860266
KUWAIT DRLG CO P O Box 1401 Orange CA 92668 714-558-1300
LOFFLAND BROS CO P O Box 2847 Tulsa OK 74101 918-622-9330
NATIONAL DRLG CO P O Box 4017 Abu Dhabi UAE 820330AUN
NAVIER PEREZ COMPANIA Florida 234-3 Piso Buenos Aires Argentina 46-4081/9
O'CONNOR & YOUNG DRLG CO 1980 S Post Oak Rd Suite 2380 Houston TX 77056 713-961-1107
OIL DRLG & EXPL LTD Level 36 AMP CNT 50 Bridge S Sydney NSW 2000 Australia 232-2066
ORKUSTOFNUN STATE DRLG CONTRS Grensasveg 9 108 Reykjavik Iceland
PANTERRA LTD (Affiliate of Pool-Intairdril) P O Box 4271 Houston TX 77210 713-780-4999
PARKER DRLG CO 8 E Third St Tulsa OK 74103 918-585-8221
PERFORADORA MEXICO SA Insurgentes 432 9th Floor Mexico City 7 DF Mexico
POOL AMERICA INC 2077 S Gessner Rd Houston TX 77063 713-780-4999
POOL ARABIA LTD P O Box 4271 Houston TX 77210 713-780-4999
POOL INTAIRDRIL P O Box 4271 Houston TX 77210 713-780-4999
PREUSSAG AKTIENGESELLSCHAFT Erdoll und Erdgas P O Box 1628 3150 Peine West Germany (0511) 19321
RBI DRLG LTD 3-Ashford 901 Threadneedle Suite 200 Houston TX 77079 713-496-5000
RICHTER DRLG PTY LTD GPO Box 2197 Brisbane Queensland 4001 Australia 229-2544
RIO COLORADO SA Sarmiento 663 Buenos Aires Argentina
SAIPEM SPA P O Box 4159 San Donato Milanese 20100 Milano Italy 02 5201
SANTA FE DRLG CO 505 S Main St Orange CA 92668 714-589-1300
SEDCO DUBAI LTD 1901 N Akard Dallas TX 75201 214-653-8855
SEDCO INC 1901 N Akard Dallas TX 75201 214-653-8855
SEDCO INTL SA P O Box 833 Tehran Iran 621015-6
SKINNER DRLG CONTRACTORS LTD P O Box 46 San Fernando Trinidad West Indies 65-77265
SKINNER MARINE OPERATIONS LTD P O Box 46 San Fernando Trinidad West Indies 65-77265
WELL SERVICES LTD P O Box 152 San Fernando Trinidad West Indies
WESTBURNE INTL DRLG LTD P O Box 1558 Hamilton 5 Bermuda 809-292-3536

Petroleum Engineer INTERNATIONAL

International Contract Rotary Land Drilling Rigs

AFRICA

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
ALGERIA						
Parker Drlg	129-HH/17	dsl	1500	OIME TBA-2000	1700	20,000
	133-HH/21	dsl	1500	OIME TBA-2000	1700	20,000
	140-HH/28	dsl	1500	OIME TBA-2000	1700	20,000
	144-HH/30	dsl	1500	OIME TBA-2000	1700	20,000
	145-HH/31	dsl	1500	OIME TBA-2000	1700	20,000
	146-HH/32	dsl	1500	OIME TBA-2000	1700	20,000
	155-HH/26	dsl	1500	OIME TBA-2000	1700	20,000
	156-HH/36	dsl	1500	OIME TBA-2000	15000	
	160	dsl	1500	OIME TBA-2000	1700	20,000
SAIPEM	5891	dsl-elec	3200	National 110-DE	1500	20,000
	5892	dsl-elec	3200	National 110-DE	1500	20,000
	5893	dsl-elec	3200	National 110-DE	1500	20,000
	5894	dsl-elec	3200	National 110-DE	1500	20,000
	5895	dsl-elec	3200	National 110-DE	1500	20,000
Westburne Intl Drlg	206	dsl-elec	3975	A-800-E	1500	18,000
	207	dsl-elec	3975	National 110-UE	1500	18,000
	208	dsl-elec	3975	EMSCO C-1-11	1500	18,000
	209	dsl-elec	3975	EMSCO C-1-11	1500	18,000
CONGO						
Forasol	Natl 110-9	dsl-elec	2600	National 110-DE	1500	16,000
EGYPT						
Egyptian Drlg	1	dsl		National 110-UE		16,000/5"
	2	dsl		Cabot/Franks SD-2346		12,000
FOREX-Neptune	N-110/7	dsl	3200	National 110	1600	19,000/5"
Santa Fe Drlg	64	dsl	1800	National 110	1800	16,000
	69	dsl-elec	2000	National 1320-DE	3400	20,000
	73	dsl	2000	National 110	1800	16,000
	97	dsl-elec	2800	OILWELL E-2000	2000	20,000
GABON						
Forasol	H525-[illegible]	dsl-elec	1600	Ideco H-525	800	8,000
	H525-2	dsl-elec	1600	Ideco H-525	800	8,000
	Natl 110-5	dsl-elec	2600	National 110-DE	1500	16,000
	1	dsl	1200	National 80-B	1850	12,000
	5	dsl-elec	2600	National 110-UE	1850	15,000
FOREX-Neptune	S-7-11/22	dsl	2600	Ideco Super 7-11	1200	18,000
LIBYA						
Arab Drlg & Workover	ADWOC-2	dsl-elec	2600	EMSCO C-111	1500	20,000
	ADWOC-3	dsl-elec	2600	EMSCO C-111	1500	20,000
	118	dsl	1250	Ideco H-525	700	9,000
	37	dsl	1550	National 80-B	1800	12,000
	53	dsl	1250	Ideco H-525	700	9,000
	54	dsl	1400	National 80-B	1800	12,000
Challenger Drlg	19	dsl	1400	National 80-B	1500	15,000
Deutsche Tiefbohr	T-16	dsl	2000	EMSCO A-800	1000	12,000
	T-26	dsl	2550	Ideco Super 7/11	1500	16,000
FOREX-Neptune	DS-1	dsl	1300	Ideco H-525	640	9,000
	GD-1100/5	dsl-elec	3200	Gar-Den 1110-E	1600	18,000
	N-110/6	dsl	2600	National 110	1600	19,000/5"
	N-80-UE/2	dsl	2000	National 80-UE	1000	15,700
	N-80-3	dsl-elec	2000	National 80-UE	1000	15,700
	S-7-11/13	dsl	2500	Ideco Super 7-11	1200	18,000
	S-7-11/2	dsl	2600	Ideco Super 7-11	1600	18,000
	S-7-11/24	dsl	3200	Ideco Super 7-11	1600	18,000
	S-7-11/8	dsl	3200	Ideco Super 7-11	1200	18,000
International Drlg SA	18	dsl	1455	National 80-B	1455	12,000
	19	dsl	1200	National 55-P	1700	9,000
	21	dsl	1200	National 55-P	1700	9,000
	23	dsl	1455	National 80-B	1455	12,000
	8	dsl	2000	National 110	2250	13,000
KCA Drlg	100	dsl	320	Cardwell KM-250	320	3,000
	101	dsl	300	Franks Sahara	320	3,000
	102	dsl	320	Franks Sahara	320	3,000
	103	dsl	320	Franks Sahara	320	2,000
	83	dsl-elec	1000	M-CSCO U-36-EA	1000	10,000
Loffland Bros	168	dsl	2300	M-CSCO U-914	2300	16,000
Oil Drlg & Expl	7	dsl	2000	Ideco Super 7-11	2000	17,000
	9	dsl	2000	Ideco Super 7-11	2000	17,000
Pool Intairdril	10	dsl	318	Cabot/Franks 1058/120	318	5,000
	2	dsl	318	Cabot/Franks 1287/120	476	5,000
	204	scr	2000	Ideco ED-1200	1000	12,000
	205	dsl	2000	Ideco ED-1200	1000	12,000
	206	scr	2000	Ideco ED-1200	1000	12,000
	22	dsl	400	Ideco DIR-550	400	6,500
	3	dsl	318	Cabot/Franks 1287/120	476	5,000
	32	dsl	600	Cabot/Franks 750	600	6,500
	33	dsl	600	Cabot/Franks 750	600	6,500
	34	dsl	600	Cabot/Franks 750	600	6,500
	5	dsl	318	Cabot/Franks 1058/120	318	5,000
Santa Fe Drlg	ADWOC 1	dsl-elec	2600	EMSCO C-111	1500	20,000

AFRICA(Cont'd)

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
MALI						
FOREX-Neptune	49	dsl-elec	3200	Gar-Den 1100-E	1500	18,000
MOROCCO						
Forasol	3	dsl-elec	3200	National 1320-UE	2000	20,000
NIGERIA						
FOREX-Neptune	GD-2100/3	dsl-elec	3200	Gar-Den 2100-RE	3000	25,400
	GD-2100/4	dsl-elec	3200	Gar-Den 2100-RE	3000	25,400
	GD-2100/5	dsl-elec	3200	Gar-Den	3000	25,400
	H-20	dsl	225	Ideco H-20	180	3,600
	H-525/4	dsl	550	Ideco H-525	500	9,000
	N-110-11	dsl-elec	3200	National 110-UE	1500	19,000
	N-110/10	dsl	2600	National 100	1600	19,000
	N-110/4	dsl	2850	National 110	1600	19,000/5"
	N-110/5	dsl	2600	National 110/5	1600	19,000
	S-7-11/19	dsl	2600	Ideco Super 7-11	1200	18,000
	S-7-11/26	dsl	2600	Ideco Super 7-11	1200	18,000
Sedco Intl SA	59	dsl	2800	OILWELL 860	2200	16,000
SAIPEM	5838	dsl	2500	Ideco P Super 7-11	1590	16,500
	5847	dsl	2130	Ideco P Super 7-11	1375	16,500
	5850	dsl	1135	Ideco P H-40	432	4,800
	5860	dsl	2500	Ideco P Super 7-11	1590	16,500
SOMALIA						
Parker Drlg	143	dsl	2000	National 110	2300	20,000
SUDAN						
Parker Drlg	105-HH/2	dsl	1200	OIME	1275	14,000
	119-HH/10	dsl	1500	OIME	1700	18,000
TUNISIA						
Forasol	Natl 110-2	dsl-elec	1700	National 110-DE	1500	16,000
	Natl 110-7	dsl-elec	2600	National 110-DE	1500	16,000
	2	dsl	2700	National 110	1850	15,000
	7	dsl-elec	2600	National 110-UE	1850	15,000
FOREX-Neptune	GD-1100/6	dsl-elec	3200	Gar-Den	1600	18,000
Sedco Intl SA	93	dsl	1700	National 80-B	3300	12,000
SAIPEM	5842	dsl	2250	Ideco P Super 7-11	1740	16,500
	5846	dsl	2250	Ideco P Super 7-11	1740	16,500
ZAIRE						
Parker Drlg	197-HH/43	dsl	2000	OIME TBA-2000	2000	20,000

ASIA

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
BANGLADESH						
Parker Drlg	194-HH/41	dsl	2000	OIME TBA-2000	2000	20,000

AUSTRALIA

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
AUSTRALIA						
Oil Drlg & Expl	12	dsl	1000	National 50		
	15	dsl	2000	Ideco H-1700	2000	17,000
	16	dsl	1600	Ideco 1200	1600	14,000
	5	dsl	1100	Ideco Jr Super 7-11	1100	1,300
	6	dsl	1200	National 55	850	10,000
	8	dsl	350	Ideco H-35	500	4,500
Pool Intairdril	11	dsl	235	Gar-Den 1000	235	1,000
	14	dsl	100	Schramm	200	1,000
	18	dsl	110	Schramm T-64-HB	275	
	216	dsl		Wilson Super 38		3,400
	218	dsl		Ideco H-44	750	8,500
	8	dsl	300	Gar-Den 15-W	300	1,500
	9	dsl	420	Cabot/Franks Expl 1058-160	420	5,000
Westburne Drlg Canada	19	dsl	870	National T-32	360	7,500
QUEENSLAND						
Richter Drlg Pty	1	dsl	336	Sullivan 300-A	171	3,500
	2	dsl	900	National 55	900	10,000
	7	dsl-elec	1600	National 610	750	10,000
SOUTH AUSTRALIA						
Richter Drlg Pty	10	dsl-elec	1500	National 110-UE	1500	17,000
	3	dsl	600	National T-32	300	5,500
WESTERN AUSTRALIA						
Richter Drlg Pty	4	dsl	600	National T-32	300	6,000
	9	dsl	2400	National 80-B	1600	12,000

CENTRAL AMERICA

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
COSTA RICA						
Foramines	4	dsl	850	Ideco H-525	700	25,000
EL SALVADOR						
Foramines	2	dsl	650	EMSCO GB-250	500	28,000
	5	dsl	450	Cooper TD-420-10	350	18,000
GUATEMALA						
Bowden Drlg Intl	5	dsl	2000	National 110-M	1500	18,000

CENTRAL AMERICA (Cont'd)

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
GUATEMALA (Contd)						
FOREX-Neptune	GD-1500/3	dsl-elec	3200	Gar-Den	2000	21,700
	H-525/9	dsl	1300	Ideco H-525	500	9,000
Helmerich & Payne (Guatemala)	16	dsl-elec	2600	HS-1500	1500	18,000
	45	dsl-el-scr	3000	National 1320	2000	25,000
Parker Drlg	185-HH/40	dsl	2000	OIME TBA-2000	2000	20,000

EUROPE

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
BELGIUM						
Foramines	1	dsl	1200	EMSCO GB-800	800	36,000
	3	dsl	850	Salzgitter FB-415	740	27,000
	9	dsl	140	Salzgitter PS-150	160	400
DENMARK						
Deutsche Tiefbohr	T-14	dsl	2400	EMSCO A-800	1000	14,000
	T-36	dsl	1650	Ideco BIR-800	950	8,000
ENGLAND						
Houlder Marine Drlg	1	dsl-elec	1600	National 80-UE	1000	12,000
FRANCE						
COSIFOR	E-350	dsl	1500	EMSCO 350	550	9,000
	G-10-E	dsl-elec	1600	National 610-E	800	12,000
	N-110	dsl	2500	National 110	1500	18,000
Foramines	8	dsl	250	Foramines RC-15	320	1,000
	GD-2100-1	dsl-elec	3200	Gar-Den 2100-DE	2100	20,000
	H-35	dsl	800	Ideco H-35	350	5,000
	Ideco 900-1	dsl-elec	1600	Ideco 900	1000	12,000
	Natl 110-6	dsl-elec	2600	National 110-DE	1500	16,000
	Natl 1320-1	dsl-elec	3200	National 1320-DE	2000	20,000
	Natl 1625-3	dsl-elec	3200	National 1625-DE	3000	25,000
	Natl 80-B-1	dsl-elec	2000	National	1000	12,000
	1	dsl-elec	500	Ideco H-35	300	5,000
	1	dsl-elec	2600	Gar-Den 2100	2000	20,000
	1	dsl-elec	1200	Ideco H-525	800	9,000
	1	dsl		Ideco H-25	200	5,000
	2	dsl	500	EMSCO 160	250	4,000
	3	dsl-elec	3600	National 1625-DE	2400	20,000
	6	dsl-elec	2600	National 110-UE	1850	15,000
FOREX-Neptune	GC-500/1	dsl	1600	EMSCO GC-500	500	10,800
	1100/1	dsl-elec	2900	EMSCO 1100-DE	1500	18,000
	800/2	dsl	2000	EMSCO A-800	800	12,000
	GD-1100/3	dsl-elec	3200	Gar-Den 1100	1500	18,000
	H-25/2	dsl	1200	Ideco H-25	250	4,400
	H-40/2	dsl	900	Ideco H-40	500	9,000
	H-525/3	dsl	1250	Ideco H-525	500	9,000
	N-55/29	dsl	310	National 55	700	10,800
	S-7-11/20	dsl	2850	Ideco Super 7-11	1200	18,000/5"
	S-7-11/23	dsl	3200	Ideco Super 7-11	1200	18,000
GERMANY						
Deutsche Tiefbohr	T-2	dsl	490	Ideco H-525-D	620	6,000
ITAG-CELLE	ZA-312	dsl	500	SMG	250	4,500
	1	dsl	500	Wilson Mogul 42	600	9,500
	110-M	dsl	2600	National 110-M	1500	18,000
	2	dsl	1350	Wilson Mogul 42	250	8,000
	5	dsl	1600	Wilson Mogul 42	700	10,500
Preussag Aktiengesellschaft	GH-25	dsl	2600	Wirthco GH-25	1500	16,000
	GH-35	dsl	2600	DeMag GH-35	1500	17,500
	ZA-292	dsl	500	Salzgitter	180	5,000
	1	dsl	1100	Cabot/Franks Model 2346	900	10,000
	2	dsl	1500	Cabot/Franks Model 2346	900	10,000
HOLLAND						
Kenting	21	dsl-elec	1000	National 80-UE	2000	15,000/5"
ICELAND						
Orkustofnun State Drlg Conrrs	DOFRI	dsl	1350	OILWELL 52-T	320	7,300
	GLAUMUR	dsl	290	Failing 2000	290	3,700/2⅞"
	JOTUNN	dsl-elec	1500	Gar-Den 700-E	750	145
	NARFI	dsl	580	Failing 3000	290	6,000/3½"
	YMIR	dsl	180	Mayhew 1000	180	1,800/2⅜"
ITALY						
Forasol	80-B-2	dsl-elec	2600	National	1000	12,000
	80-B-3	dsl-elec	2600	National	1000	12,000
	80-B-4	dsl-elec	2600	National	1000	12,000
	2	dsl-elec	1600	National 80-UE	1000	12,000
	3	dsl-elec	2600	National 80-UE	1000	12,000
Panterra Ltd	211	scr	1300	Ideco 1700	2000	17,000
	212	scr	1300	Ideco 1200	1000	12,500
SAIPEM	5803	dsl	1400	Ideco H-7-11	885	11,400
	5806	dsl	440	Cardwell 02	590	8,100
	5836	dsl	2600	Ideco P 1350-S	1950	20,000
	5840	dsl-elec	2600	Ideco H-1700	1700	16,500
	5852	dsl-elec	880	Ideco E-525	625	6,000
	5856	dsl	1700	Ideco P Jr Super 7-11	1740	12,600
	5858	dsl	1135	Ideco P H-40	432	4,800
	5864	dsl-elec	2900	EMSCO C-3 Type 2 Pot	3000	25,000

EUROPE (Cont'd)

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
ITALY (Contd)						
SAIPEM	5872	dsl-elec	2600	National 16	3000	25,000
	5888	dsl-elec	3200	National 1625	3000	25,000
	5889	dsl	3200	Ideco E-3000	3000	30,000
	5898	dsl-elec	2600	Ideco HE-1700	1700	16,500
	5899	dsl	1400	Cardwell 03	1050	10,400
	6944	dsl	109	Ideco P H-30	295	3,590
NETHERLANDS						
Deutsche Tiefbohr	T-11	dsl	1700	National 80-B	1000	13,000
	T-19	dsl	2000	National 80-BE	1000	13,000
	T-27	dsl-elec	2600	National 130	1625	16,000
	T-30	dsl-elec	1000	Ideco E-725-D	600	6,000
	T-32	dsl	380	Ideco BIR-3085 H-35-KD	300	3,000
	T-4	dsl	500	Ideco H-30	425	6,000
PORTUGAL						
Foramines	6	dsl	280	Failing 2500	240	1,000
	7	dsl	350	Ideco H-25	350	15,000
SPAIN						
Boldon Drlg	80	dsl-elec	800	National 80-UE	1000	14,000
Compania Gen De Sondeos SA	G-450	dsl	1050	EMSCO G-450	450	10,000
	110	dsl	3000	National T-2029	1700	19,700
	800	dsl	2400	Gar-Den	1470	14,800
Forasol	110-8	dsl-elec	2600	National 110-DE	1500	16,000
	1320-2	dsl-elec	3200	National 1320-DE	2000	20,000
	1625-2	dsl-elec	3200	National 1625-DE	3000	25,000
	1	dsl-elec	3200	National 1320-UE	2000	20,000
	2	dsl-elec	3200	National 1625-DE	2000	20,000
	2	dsl-elec	3200	National 1320-UE	2000	20,000
	8	dsl-elec	2600	National 110-UE	1850	15,000
UNITED KINGDOM						
Boldon Drlg	21	dsl	370	National T-20	290	4,500
	22	dsl	590	National T-20	335	5,500
	23	dsl	350	National T-20	280	4,000
	32	dsl	590	National T-32	500	7,000
Kenting	12	dsl	350	Brewster N-45	350	8,000
	17	dsl	350	Stratmaster 90	350	5,000/3½"
	19	dsl	350	Gar-Den 3000	230	4,500/4"
	26	dsl	350	Cardwell TR-69	350	6,000
	31	dsl-elec	2000	National 110-UE	1000	14,000
KCA Drlg	104	dsl		Franks 550	320	5,000
WEST GERMANY						
Deutsche Tiefbohr	T-1	dsl	490	Ideco BIR-800 H-1000	910	8,000
	T-12	dsl	490	Ideco H-525-D	620	6,000
	T-29	dsl-elec	2300	National 1320-ME	2000	18,000
	T-3	dsl	490	Ideco H-44-CD	590	5,000
	T-5	dsl	490	Ideco H-525-D	620	6,000
	T-7	dsl	1400	National 55	700	11,000
	T-8	dsl	490	Ideco PIR-800 H-1000	910	8,000
	T-9	dsl	490	Ideco BIR-800 H-1000	910	8,000

MEXICO

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
GUADALAJARA						
Constructora Y Per Latina SA	PC-5	dsl		B Erie 36 LD-53	150	1,700
	PR-12	dsl		Failing 2500	160	2,500
	PR-20	dsl		Failing 2500	160	2,500
	PR-9	dsl	165	Failing 1500	134	1,500
HIDALGO						
Constructora Y Per Latina SA	PT-17	dsl	1020	EMSCO GA-500	500	6,500
	PT-18	dsl	1020	EMSCO GB-500	500	6,500
MEXICO						
Constructora Y Per Latina SA	GT-33	dsl	1000	EMSCO G8-800	1000	12,000
	GT-34	dsl	1000	EMSCO G8-800	1000	12,000
	PC-20	dsl		B Erie 36 LD-53	150	1,700
	PC-25	dsl		Walker-Neer FWN-40	80	1,700
	PC-26	dsl		Walker-Neer FWN-40	80	1,700
	PC-27	dsl		Walker-Neer FWN-40	80	1,700
	PC-29	dsl		Walker-Neer FWN-40	80	1,700
	PC-3	dsl		Walker-Neer S-32-SP	110	1,700
	PC-30	dsl		Stenvic AS-5		300
	PP-1	dsl		Walker-Neer WS-31	80	1,700
	PP-2	dsl		Walker-Neer S-32-SP	125	1,700
	PP-4	dsl		Walker-Neer S-32-SP	110	1,700
	PR-10	dsl		Failing 1500	180	1,500
	PR-11	dsl		Failing 2500	160	2,500
	PR-13	dsl		Failing 2500	160	2,500
	PR-21	dsl		Failing 2500	160	2,500
	PR-7	dsl	308	Failing 1500	150	1,500
	PS-14	dsl	308	EMSCO 250 Perlasa	250	3,000
	PS-15	dsl	308	Wagner-Morehouse M-41-AZ	180	3,000

MEXICO (Cont'd)

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½″ Pipe
MEXICO (Contd)						
Constructora Y Per Latina SA	PS-31	dsl	308	Wagner-Morehouse M-41-AZ	180	3,000
	PT-19	dsl	1100	EMSCO J-750	750	9,500
Perforadora Mexico SA	Reforma	dsl-elec	5000	National 1625-DE	3000	25,000
	Revolucion	dsl-elec	5000	National 1625-DE	3000	25,000
	8	dsl-elec	2000	National 1320-UE	2000	2,600
PUEBLA						
Constructora Y Per Latina SA	PC-28	dsl		Walker-Neer FWN-40	80	1,700
	PR-32	dsl		Failing 2500	160	2,500
Perforadora Mexico SA	7	dsi-elec	2000	National 1320-UE	2000	2,600

MIDDLE EAST

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½″ Pipe
ABU DHABI						
FOREX-Neptune	GD-1100/2	dsl-elec	3200	Gar-Den 1100	1500	18,000
	GD-1100/4	dsl-elec	3200	Gar-Den 1100	1500	18,000
	N-80-4	dsl-elec	2000	National 80-UE	1000	15,700
Geoprosco Intl	35	dsl	375	Cardwell K-250-M	475	6,000
	36	dsl	600	Ideco H-900	725	10,000
	39	dsl		Ideco H-30	475	7,000/3½"
	40	dsl		Ideco H-30	475	7,000/3½"
	41	dsl	2200	Ideco H-900	1100	10,000
	42	dsl-elec	700	Ideco ED-900	1000	10,000
	43	dsl0elec	700	Ideco ED-900	1000	10,000
National Drlg	1	dsl-elec	3000	OILWELL E-840	1500	17,500
	2	dsl-elec	3000	OILWELL E-840	1500	17,500
Pool Intairdril	213	scr	900	Ideco 900	1000	10,500
	214	scr	900	Ideco 900	1000	10,500
	215	scr	900	Ideco 900	1000	10,500
SAIPEM	5827	dsl-elec	3200	Ideco I	2000	20,000
	5828	dsl-elec	3200	Ideco E-2100	2000	20,000
	5887	dsl-elec	3200	National 1625	3000	25,000
Westburne Intl Drlg	210	dsl-elec	5300	National 3120-UE	1500	20,000
	212	dsl-elec	5300	National 110-UE	1500	18,000
	213	dsl-elec	5300	National 110-UE	1500	18,000
IRAN						
SAIPEM	5837	dsl	2600	Ideco P-1350-S	1950	20,000
IRAQ						
FOREX-Neptune	GD-2100/21	dsl-elec	3200	Gar-Den	2300	25,400
SAIPEM	5843	dsl-elec	2800	OILWELL E-2000	2000	20,000
	5848	dsl	2600	Ideco P Super 7-11	1740	16,500
	5849	dsl	2600	Ideco P Super 7-11	2100	16,500
	5855	dsl	1800	Ideco P Jr Super 7-11	1740	12,600
	5863	dsl-elec	3200	National 110-DE	1500	20,000
	5870	dsl-elec	3200	National 1625	3000	25,000
Westburne Drlg	214	dsl-elec	2900	National 110-UE	1500	18,000
KUWAIT						
FOREX-Neptune	GD-2100/22	dsl-elec	3200	Gar-Den 2100	2300	25,400
	S-7-11/15	dsl-elec	3200	Ideco Super 7-11	1200	18,000
	KDC-5	dsl-elec	1700	Gar-Den 800-E	800	12,000
	KDC-7	dsl-elec	1700	Gar-Den 800-E	800	12,000
Kuwait Drlg	KDG-6	dsl-elec	5100	OILWELL E-3000	3000	30,000
Parker Drlg	189	dsl-elec	3200	OIME 3000-E	3000	30,000
Santa Fe Drlg	KDC-8	dsl-elec	1400	OILWELL E-2000	2000	20,000
	KDC-9	dsl-elec	1400	OILWELL E-2000	2000	20,000
OMAN						
Deutsche Tiefbohr	T-33	dsl	1600	National 55	700	11,000
	T-34	dsl	1650	Ideco BIR-800	950	8,000
	T-17	dsl-elec	2700	National 1320	1800	18,000
	T-18	dsl	2600	National 55	700	11,000
FOREX-Neptune	Junior 1200	dsl	1800	Ideco Junior 1200	1400	11,500
Pool Intairdril	27	dsl	600	Cabot/Franks 750	650	7,500
Sedco Intl SA	92	dsl	2000	OILWELL 760	1000	12,000
	94	dsl-elec	2100	National 80-B	1100	12,000
	95	dsl-elec	2800	National 1320-UE	4950	20,000
	96	dsl	2000	OILWELL 860	2200	16,000
PAKISTAN						
Deutsche Tiefbohr	T-10	dsl	2700	National 80-B	1000	13,000
QATAR						
Deutsche Tiefbohr	T-6	dsl	490	Ideco BIR-800 H-1000	910	8,000
Santa Fe Drlg	89	dsl-elec	2000	National 110-UE	1800	16,000
	93	dsl-elec	1700	National 80-UE	700	12,000
SAUDI ARABIA						
International Drlg SA	37	dsl-elec	2000	Ideco ED-1200	1200	13,000
Pool Arabia	128	dsl	230	Cabot/Franks Expl III	450	6,500
	138	dsl	450	Cabot/Franks	450	6,500
	15	dsl	420	Ideco DIR-550	420	6,500
	190	dsl	550	Pool	700	7,500
	191	dsl	550	Pool	700	7,500
	201	dsl	1400	OILWELL	1000	3,000

MIDDLE EAST (Cont'd)

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½″ Pipe
SAUDI ARABIA (Contd)						
Pool Arabia	202	dsl	1400	OILWELL	1000	12,000
	203		1400	OILWELL	1000	12,000
	23	dsl	300	Ideco H-40	450	8,000
	29	dsl	420	Cabot/Franks Expl 1058	420	6,000
	40	dsl	600	Cabot/Franks 700	600	6,500
Santa Fe Drlg	101	dsl-elec	2600	National 110-UE	1500	16,000
	102	dsl-elec	2400	National 110-UE	1500	16,000
	104	dsl-elec	3400	National 1100-UE	1500	16,000
	109	dsl-elec	2000	National 110-UE	1800	16,000
	67	dsl-elec	2400	National 1320-DE	3400	20,000
	70	dsl-elec	2000	National 1320-DE	3400	20,000
	[illegible]	dsl-elec	2000	National 1320-DE	2000	20,000
	92	dsl-elec	2800	National 1320-UE	1400	20,000
	94	dsl-elec	2250	National 110-UE	2000	16,000
SHARJAH						
Sedco Dubai Ltd	98	dsl-elec	2600	National 1320-UE	3000	25,000
SYRIA						
Continental Drlg & Dev	1	dsl	1000	National 80-S	1400	10,000
Parker Drlg	195-HH/42	dsl	2000	OIME TBA-2000	2000	20,000
Santa Fe Drlg	75	dsl	2000	National 1320-M	1800	20,000
TURKEY						
Aladdin-Middle East	1	dsl	1285	Bethlehem M-58	1000	12,000
KCA Drlg	71	dsl	2580	National 80-B	1540	12,000
UAE						
Sedco Dubai Ltd	97	dsl	2700	OILWELL 860	2200	16,000

SOUTH AMERICA

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½″ Pipe
ARGENTINA						
Astrafor SAIC	1	dsl	1500	EMSCO GC-350	800	10,000
	2	dsl	1500	EMSCO GC-358	800	10,000
	3	dsl	1600	EMSCO G-500	1000	12,000
	4	dsl	1500	EMSCO GC-350	800	10,100
	5	dsl	1600	EMSCO A-800	1500	14,000
	6	dsl	1400	Ideco BIR-800	800	8,000
	7	dsl	1600	EMSCO A-800	1500	14,000
	8	dsl	1600	EMSCO A-80	1000	12,000
	9	dsl	1400	Ideco BIR-800	800	8,000
Navier Perez Companc	1	dsl	1400	Cardwell J-450	700	6,900
	2	dsl	1400	Cardwell J-450	700	6,900
	28	dsl	1600	Gar-Den 800	1050	12,000
	29	dsl	1600	Gar-Den 700	700	10,000
	3	dsl	1400	Cardwell J-450	700	6,900
	37	dsl	1400	Cardwell KB-210	350	5,900
	4	dsl	1400	Cardwell J-450	700	6,900
	42	dsl	1600	Gar-Den 700		10,000
	5	dsl	1400	Cardwell KM-250	350	5,900
	6	dsl	1400	Cardwell KM-250	350	5,900
Rio Colorado SA	E-101	dsl	1250	M-CSCO U-36-A	700	10,000
	E-102	dsl	1250	M-CSCO U-36-A	700	10,000
	E-103	dsl	1250	M-CSCO U-36-A	700	10,000
	E-105	dsl	1000		600	8,500
	E-107	dsl	1800	National 100-N	1000	18,000
	E-108	dsl	1250	National	750	10,000
	E-109	dsl	1250	National N-75	750	11,500
	E-110	dsl	1000	Ideco H-40	500	6,500
	E-111	dsl	1500	Gar-Den 800	1000	12,000
	E-112	dsl	1000	Ideco H-40	500	5,500
	E-113	dsl	1600	Gar-Den 800	1000	15,000
	E-125	dsl	880	National T-440	450	6,000
	E-127	elec	2660	Gar-Den 1500-E	3000	20,000
	E-128	dsl-elec	1140	Ideco E-525	625	10,000
	E-129	dsl	1600	National 75	750	14,000
	E-130	dsl	1320	Ideco H-40	450	8,000
	E-132	dsl	1320	National 1320	450	8,000
	E-134	dsl-elec	2600	National 1625	3000	25,000
	E-137	dsl	1900	Ideco H-1200	1800	16,000
	E-301	dsl	230	Cardwell KB-500	380	
	E-302	dsl	160	WM-191	380	
	E-307	dsl	160	Ideco H-25	380	
	E-309	dsl	230	Ideco KB-210-A	280	
	E-310	dsl	230	Cardwell KB-200-C	380	
	E-317	dsl	550	Cardwell KB-200-C	370	6,000
	E-318	dsl	550	Ideco H-30	230	5,000
	E-319	dsl	550	Ideco H-30	230	5,000
	E-320	dsl	550	Ideco H-30	230	5,000
	E-323	dsl	550	Ideco H-30	230	5,000
RBI Drlg	30	dsl	2700	National 110	3075	18,000
	31	dsl	2700	National 110	3075	18,000
SAIPEM	5830	dsl-elec	2600	National 1320	2000	16,500
	5873	dsl	700	Ideco H-37/S	650	4,000
	5884	dsl		Ideco Pignone M-20-S	760	
	5896	dsl	2000	Ideco H-1200	1200	12,000
BOLIVIA						
Drilcon	7	dsl	1290	EMSCO GB-800	1290	13,000
Helmerich & Payne Rasco	11	dsl-elec	1600	HS-1500	1500	18,000
	9	dsl-elec	1600	HS-1500	1500	18,000
Rio Colorado SA	E-104	dsl	1000	Ideco H-1000	750	10,000
	E-126	dsl	2600	National 1320-E	2000	20,000

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
SOUTH AMERICA (Cont'd)						
BRAZIL						
Navier Perez Companc	36	dsl	1600	Gar-Den 800	1050	12,000
	45	dsl-elec	2600	Ideco E-1700	1700	15,200
Parker Drlg	132-HH/20	dsl	1500	OIME TBA-2000	1700	20,000
	134-HH/22	dsl	1500	OIME TBA-2000	1700	20,000
	151-HH/34	dsl	1500	OIME TBA-2000	1700	20,000
Rio Colorado SA	E-119	dsl	1650	EMSCO A-800	1650	14,000
	E-120	dsl	2600	Brewster N-95-A	2550	20,000
	E-121	elec	2600	Brewster N-95-A	1500	20,000
	E-122	elec	2600	Brewster N-95-A	1500	20,000
	E-123	elec	2600	National 1320-E	1500	20,000
	E-124	elec	2600	National 1320-E	1500	20,000
COLOMBIA						
Bawden Drlg Intl	4	dsl-scr	2000	National 80-BE	1000	14,000
Helmerich & Payne (Colombia)	7	dsl-elec	1200	HS-1500	1500	18,000
	10	dsl-elec	1600	HS-1500	1500	18,000
Parker Drlg	104	dsl	1400	National 50-A	1275	10,000
	110-HH/9	dsl	1500	OIME	1700	17,000
	158	dsl	1200	National 80-B	1700	15,000
	209	gas	750	National 75	750	10,000
	80	dsl	2900	National 130	2900	25,000
Pool America	208	dsl	2000	OIME	1000	12,000
	209	dsl	2000	OIME	1000	12,000
Pool Intairdril	207	dsl	300	Pool 400	400	
ECUADOR						
Helmerich & Payne Del Ecuador	12	dsl-elec	1600	HS-1500	1500	18,000
	18	dsl	600	Cooper 550	600	6,000
Parker Drlg	102-HH-1	dsl	1200	OIME	1275	12,500
	159	dsl	2200	OILWELL 76	1560	15,000
Pool Intairdril	126	dsl	230	Wilson Mogul 42	450	6,500
	210	dsl	400	Wilson DD-42-428	450	3,000
	217	dsl	400	Ideco H-37	450	
PERU						
Belco Petr	2	dsl	1000	Brewster H-4210	700	6,000
	3	dsl	1000	National 55	700	9,000
	4	dsl	1000	National 80-B	1000	12,000
	6	dsl	1000	DH-4610 Brewster	1000	12,000
	7	dsl	850	EMSCO A-1100	1600	14,000
Blocker Intl	21	dsl	550	Ideco H-37	456	7,000
	22	dsl	550	Ideco H-37	456	7,000
	23	dsl	550	Ideco H-37	456	7,000
	24	dsl	550	Ideco H-37	456	7,000
Parker Drlg	107-HH/4	dsl	1200	OIME	1700	15,000
	108-HH/5	dsl	1500	OIME	1700	17,000
	109-HH/7	dsl	1500	OIME	1700	17,000
	127-HH/15	dsl	1500	OIME TBA-2000	1700	20,000
	131-HH/19	dsl	1500	OIME TBA-2000	1700	20,000
	154-HH/35	dsl	1500	OIME TBA-2000	1700	20,000
	206	dsl	2000	OIME TBA-2000		
	207	dsl	2000	OIME TBA-2000	2000	20,000
Rio Colorado SA	E-106	dsl	1000	EMSCO GC-350-T	600	8,500
	E-114	dsl	900	Cardwell T-250	500	7,500
	E-115	dsl	900	Cardwell T-250	500	7,500
	E-116	dsl	900	Cardwell T-150	500	7,500
	E-117	dsl	900	Cardwell T-250	500	7,500
	E-118	dsl	600	Ingersoll RT-5	200	3,000
VENEZUELA						
Helmerich & Payne CA	1	dsl	500	Cardwell M-250	300	6,000
	14	dsl	600	Ideco H-3F	400	7,000
	17	dsl	600	Cooper 550	600	6,000
	19	dsl	600	Cooper 550	600	6,000
	2	dsl	500	Cardwell M-250	300	6,000
	28	dsl	1500	National 110	1500	16,000
	3	dsl	600	Ideco H-37	600	6,000
	30	dsl	1200	Ideco H-525	1200	10,000
	31	dsl	1200	Ideco H-525	1000	10,000
	4	dsl	500	Cardwell M-250	300	6,000
	5	dsl	700	Ideco 525	300	7,000
	6	dsl	300	Ideco H-44	400	5,000
	67	dsl	1500	National 110	1500	18,000
Loffland Bros	14	dsl	700	M-CSCO U-36-A	785	9,000
	24	dsl-elec	2000	National 110-E	2000	14,000
	41	dsl	2000	M-CSCO U-914-C	2000	20,000
	54	dsl-elec	2900	M-CSCO U-1220-EB	3300	28,000
	61	dsl	500	Ideco H-525	566	6,500
	62	dsl	480	Ideco H-525	566	6,500
	68	dsl-elec	3200	M-CSCO U-1220-EB	3300	28,000
	94	dsl-elec	2000	M-CSCO U-1220-EB	1900	16,000
Santa Fe Drlg	110	dsl-elec	2000	National 1320-UE	2000	
	115	dsl-elec	2000	National 1320-DE	3400	
	117	dsl-elec	2800	OILWELL E-2000	2000	
	119	dsl-elec	2800	OILWELL E-2000	2000	
	125	dsl	800	Hopper GXTA	450	
	129	dsl	1700	Gar-Den 500-M	650	
	15	dsl	800	Ideco 525	600	
	16	dsl	600	National T-32	250	
	2	dsl	1700	National 130	1800	
	20	dsl	800	Ideco H-40-D	350	
	21	dsl	1200	U-914-B	1800	
SOUTH AMERICA (Cont'd)						
VENEZUELA (Contd)						
Santa Fe Drlg	22	dsl	350	Ideco H-35	350	5,000
	24	dsl	350	Ideco H-35	350	5,000
	8	dsl	2200	National 130	1800	20,000
	9	dsl	1850	National 130	1800	20,000
SOUTHEAST ASIA						
BRUNEI						
Deutsche Tiefbohr	T-31	dsl	1000	Wilson	850	8,000
INDONESIA						
Bawden Drlg Intl	28	dsl	925	EMSCO GB-350	350	7,200
	29	dsl-elec	1400	National 80-BE	1000	12,000
	6	dsl	1000	National T-45	550	7,500
	9	scr	3200	National 1320-UE	2000	22,000
Loffland Bros	139	dsl	1400	M-CSCO U-36	900	10,000
	300	dsl	600	M-CSCO U-34	500	4,000
	56	dsl	900	M-CSCO U-36-A	900	10,000
O'Connor & Young Drlg	801	dsl	1600	National 610	850	12,000
Parker Drlg	106-HH/3	dsl	1200	OIME	1275	14,000
	115-HH/8	dsl	1500	OIME	1700	18,000
	125-HH/13	dsl	1500	OIME	1700	18,000
	126-HH/14	dsl	1500	OIME TBA-2000	1700	20,000
	130-HH/18	dsl	1500	OIME TBA-2000	1700	20,000
	153/187	dsl-elec	3200	OIME 3000-E	2000	24,000
	168	dsl-elec	3200	EMSCO C-2	2000	24,000
	188-HH/38		2000	OIME TBA-2400	2000	24,000
	190-HH/39	dsl	1500	OIME TBA-2000	1700	20,000
Westburne Intl Drlg	205-H	dsl	600	T-12 Modified West Helihoist G	250	5,000
	216-H	dsl	1200	Howard-Turner MT-38-H	400	5,000
	217-H	dsl	1200	Howard-Turner MT-38-H	400	5,000
PHILIPPINES						
Richter Drlg Pty	6	dsl	1800	National 100	1800	14,000
	8	dsl	1800	National 110-M	1800	14,000
SUMATRA						
Westburne Drlg Canada	202-H	dsl	1150	National 4-10	1590	10,000
THAILAND						
Parker Drlg	200-HH/44	dsl	2000	OIME TBA-2000	2000	20,000
Sedco Intl SA	91	dsl-elec	2000	National 110-UE	3300	16,000

For a hand-held computer program tailored to your specific needs

Property Evaluation with Hand-Held Computers

is indispensable. It's a 64-page "how to" guide for the engineer who must

- *Estimate hydrocarbons initially in place in a reservoir.*
- *Predict performance and production.*
- *Evaluate economics and profit indicators.*
- *Provide support calculations.*

Each program is presented with statements, sample forms, and sample problems demonstrating the use of each program to enable you to check your program and understand the procedure.

Find out how a family of related programs can be used to perform a total property evaluation.

Order your personal copy today!

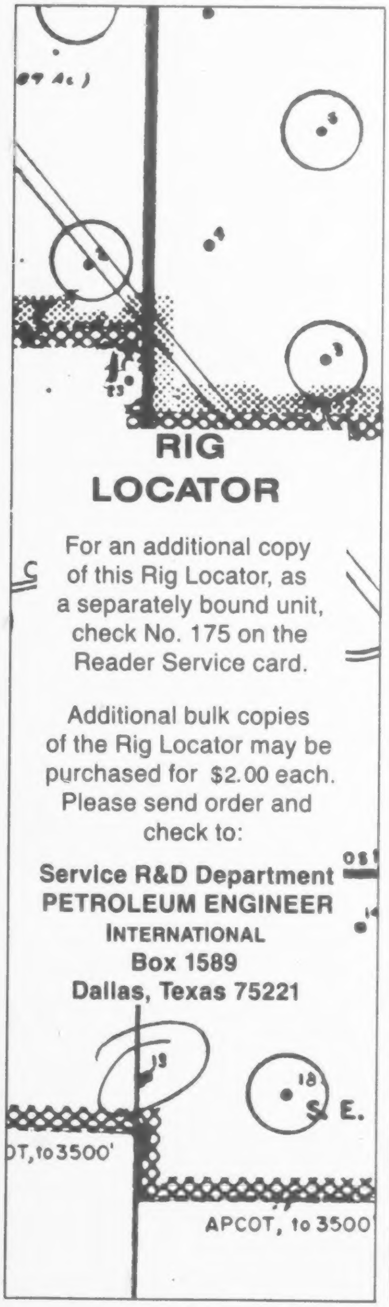
Attach your check for $24.00 to the order form below and mail to:

Petroleum Engineer International
Service R&D Department
P.O. Box 1589, Dallas, Texas 75221

Yes! Send me Property Evaluation With Hand-Held Computers!

Name ____________________ Title ____________
Company ____________________
Address ____________________
City/State/Zip ____________________

Contractor	Rig No.	Type Power	Total HP All Main Mud Pumps	Drawworks Make and Model	Total HP Available to Drwwks	Rated Depth with 4½" Pipe
WEST INDIES						
BARBADOS						
Well Serv	9	dsl-elec	2000	National 1320-UE	2000	20,000
DOMINICAN REPUBLIC						
Westburne Drlg Canada	55	dsl	3310	National 1320-UE	3310	22,000
TRINIDAD						
Skinner Drlg Contr	14	dsl	325	Ideco H-25	171	3,500
	15	dsl	90	Cabot/Franks 1287-120 DTD	180	6,500
WEST INDIES (Cont'd)						
Skinner Drlg Contr	16	dsl	180	Cabot/Franks 1287-120 DTD	240	15,200
	17	dsl	1100	OILWELL 660	840	9,000
	7	dsl	325	Ideco H-20	171	2,500
Skinner Marine Oper	16	dsl	450	Cabot/Franks 1287	300	4,000
	17	dsl	1100	OILWELL 660	840	
Well Serv	1	dsl	1400	National T-45	650	8,000
	2	dsl	1200	Gar-Den 500-M	650	9,000
	4	dsl	1000	M-CSCO U-34	600	6,000

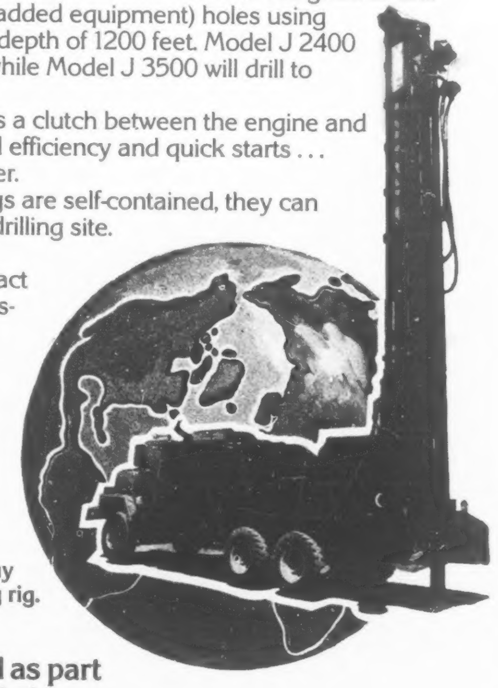


RIG LOCATOR

For an additional copy
of this Rig Locator, as
a separately bound unit,
check No. 175 on the
Reader Service card.

Additional bulk copies
of the Rig Locator may be
purchased for $2.00 each.
Please send order and
check to:

Service R&D Department
PETROLEUM ENGINEER
INTERNATIONAL
Box 1589
Dallas, Texas 75221



This is the toughest, hardest working, most economical drilling rig money can buy.

It's made by Jaswell Drill Corporation, a world leader in manufacturing self-contained, truck-mounted rotary drilling rigs.

Tough? It's built rugged, to perform better. Even under the most demanding conditions. Every part of a Jaswell rig, from its air compressor to its hydraulic system and rotary drive, can take the punishment. That's tough.

Hard working? One customer drilled 84 wells in 84 days without a breakdown. Another drilled almost 1500 hours with practically no downtime. That's hard working.

Economical? A Pennsylvania driller drilled over 150,000 punishing feet with his Jaswell rig and spent just $135 in repairs. That's economical.

Three models are available. Model J 1200 is designed to drill 6-inch to 24-inch (with added equipment) holes using 4½-inch drill steel to a depth of 1200 feet. Model J 2400 can drill to 2400 feet, while Model J 3500 will drill to 3500 feet.

Every Jaswell rig has a clutch between the engine and the compressor for fuel efficiency and quick starts . . . even in subzero weather.

And since Jaswell rigs are self-contained, they can travel to any potential drilling site. Easily and quickly.

To get the facts contact your nearest Jaswell distributor or write or call Jaswell Drill Corporation, Sanderson Road, Greenville, R.I. 02828, USA, (401) 949-3700, Telex 927506.

JASWELL J DRILL

You can't buy a better drilling rig.

Distributors wanted as part of Jaswell's worldwide sales network

Circle 320 on Reader Service Card

PETROLEUM ENGINEER International
International Land Rig Locator
P. O. Box 1589
Dallas, Texas 75221

ROTARY LAND DRILLING RIGS FORM

CONTRACTOR ______________________________

HEADQUARTERS ADDRESS ______________________________

Date: ______________________________

______________________________(ZIP CODE FOP U.S.)______________________________

NAME/TITLE ______________________________ PHONE ______________________________

Rig. No or Name	Type Power (Diesel, Gas, Gasoline)	Primary Mud Pump Make & Model	Secondary Mud Pump Make & Model	Total HP to Mud Pumps	Drawworks Make and Model	Total HP Available To Drawworks	Rated Depth With 4½ In. Pipe	PRESENT LOCATION	
								County or Area	State and Country

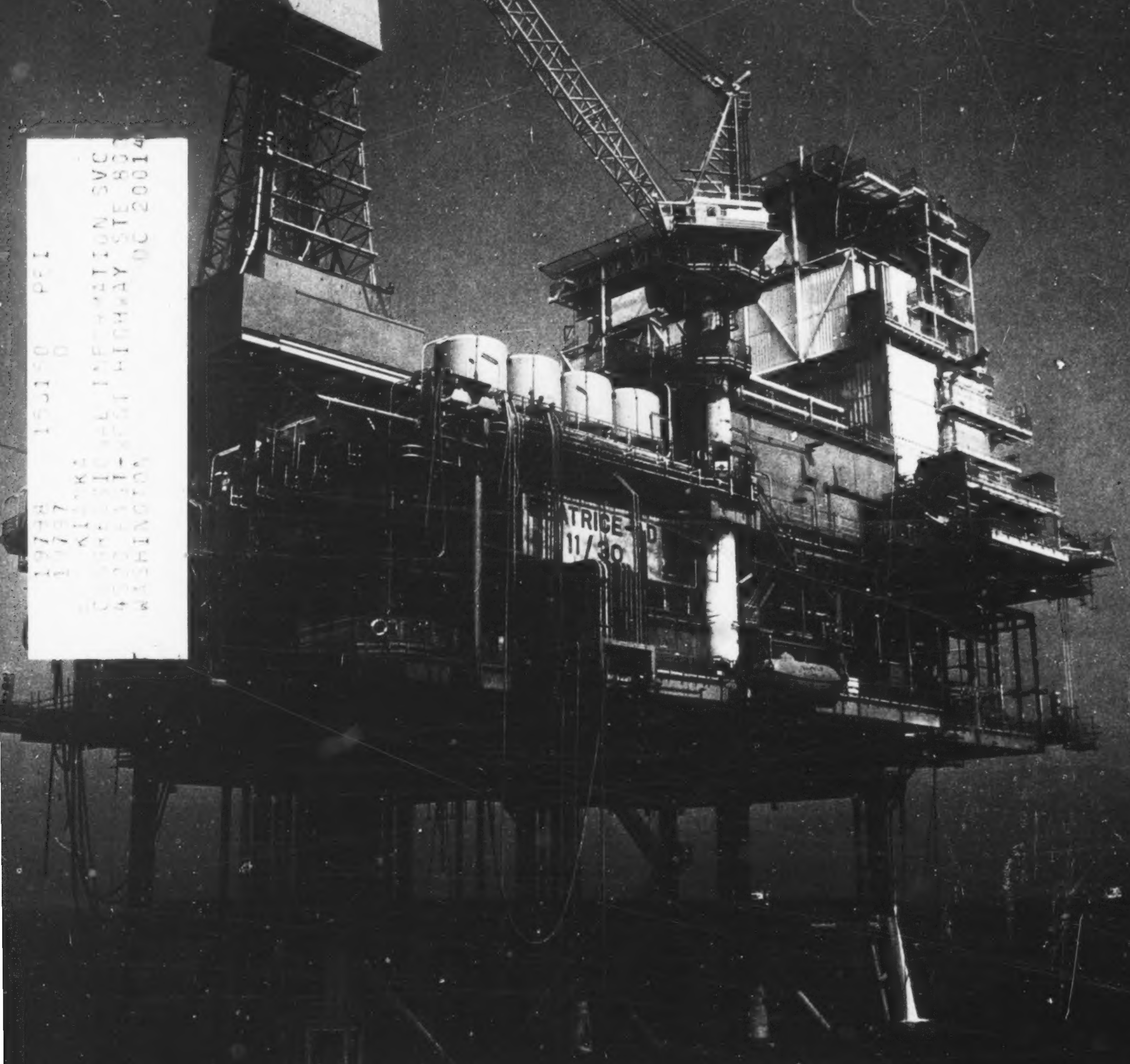
PLEASE TYPE OR PRINT

Petroleum Engineer INTERNATIONAL

OCTOBER 1981 • $2.00 PER COPY

C 3320 2

19748 15J1 0 PEI
WASHINGTON DC 20014



NORTH SEA REPORT

- North Sea Experience, p. 21
- Simulators At Ekofisk, p. 26
- Slant Drilling At Morecambe, p. 39
- Stop Scouring Before It Starts, p. 45
- International Offshore Rig Locator, p. R-1

BEST AVAILABLE COPY

Utah Joins Ranks Of Rig Count Elite

Welcome Utah to the list of states that have active rotary rig counts in three figures. This brings the number of such states to 10, which means, of course, that 20% of all states now have more than 100 rigs running.

At the beginning of September last year, Utah's rig count (as reported by Hughes Tool Co.) was only 48, so the 103 rigs counted in this report represent a 114% increase. Other noteworthy increases during the year include Montana, with 74%; Alabama, 72%; Oklahoma, 68%; North Dakota, 56%; and Kansas and Texas, both with 44%. The overall U.S. rig count increased by 37% during the September-to-September period.

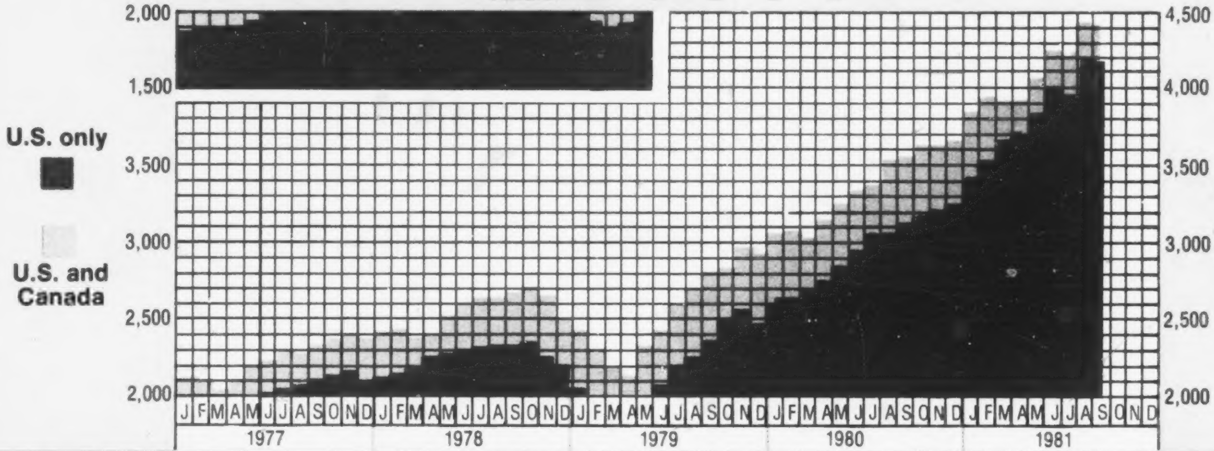
On an annual basis, the U.S. rig count this year averaged 3,781.7 going into September. At the same time last year, the annual average stood at 2,788.1. In Canada, the average going into the last third of 1980 stood at 401. This year, it is 277.

Rotary Rigs Actually Making Hole In United States & Canada

As Reported to International Association of Drilling Contractors by Hughes Tool Co.

	Aug. 17, 1981	Aug. 24, 1981	Aug. 31, 1981	Sept. 8, 1981
Alabama				
Land	16	14	13	16
Offshore	3	3	3	3
Total	19	17	16	19
Alaska				
Land	17	17	19	18
Offshore	1	1	1	1
Total	18	18	20	19
Arkansas	35	31	32	30
Arizona	2	2	2	2
California				
Land	140	140	137	137
Offshore	23	23	23	21
Total	163	163	160	158
Colorado	94	87	99	78
Florida				
Land	6	6	5	6
Offshore	2	2	2	2
Total	8	8	7	8
Hawaii	1	1	1	1
Idaho	4	4	4	4
Illinois	32	34	37	38
Kansas	197	198	205	207
Kentucky	2	4	3	3
North Louisiana	61	59	54	57
South Louisiana				
Inland Waters	84	83	83	79
Land	162	168	168	159
Offshore	162	156	158	158
Total	469	466	463	453
Maryland	1	0	1	1
Michigan	26	37	40	39
Mississippi	73	76	73	75
Montana	85	91	91	94
Nebraska	18	22	20	18

	Aug. 17, 1981	Aug. 24, 1981	Aug. 31, 1981	Sept. 8, 1981
Nevada	4	4	4	4
New Mexico	124	118	128	123
New York	15	14	14	14
North Dakota	134	117	125	125
Ohio	110	105	103	100
Oklahoma	721	730	742	755
Oregon	2	2	4	4
Pennsylvania	41	42	41	43
Rhode Island				
Offshore	2	2	2	3
South Dakota	2	2	2	3
Texas				
Offshore	74	77	76	74
Dist. 1	71	64	62	78
Dist. 2	75	87	85	71
Dist. 3	258	257	275	246
Dist. 4	125	124	124	124
Dist. 5 & 6	173	181	174	186
Dist. 7B	92	87	82	88
Dist. 7C	97	103	97	88
Dist. 8	185	169	183	188
Dist. 8A	91	100	90	102
Dist. 9	93	94	97	95
Dist. 10	78	79	73	75
Total	1412	1422	1418	1415
Utah	80	72	79	103
Virginia	6	4	6	6
Washington	3	3	3	3
West Virginia	47	55	48	53
Wyoming	192	200	201	183
Total U.S.	4142	4151	4194	4184
Western Canada	227	224	230	233
Eastern Canada	7	7	7	7
U.S. and Canada	4376	4382	4431	4424



PETROLEUM ENGINEER INTERNATIONAL • 800 Davis Building • Dallas, Texas 75202 • **TWX** 910-861-9306

Abbott Sparks	President
John G. Grant	Publisher and Vice President
Jim Donnelly	Advertising Director
W. B. Bleakley	Editor
Richard D. McNally	Associate Editor
Steven D. Moore	Drilling Editor
Mary Jane Ellis	Assistant Editor
Laura Jacobus	Assistant Editor
Edna Taylor	Editorial Assistant
J. E. (Hank) Kastrop	Consulting Editor
Renn Rothrock, Jr.	Consulting Editor
Ernestine Adams	Editor, Energy Management Rpt.
Gregory Martin	Editor, Energy News/Energy Week
Sharon Hutcheson	Editorial Assistant
Brenda Hyde	Promotion
Alan Hilton	Service R&D Manager
Dorothy Pate	Service R&D Department
Olga Dunn	Reader Service

ADVERTISING SALES OFFICES

EASTERN: Richard Martin, P. O. Box 89, Tennent, New Jersey 07763, (201) 446-3230

CHICAGO 60646: Dwain Holmgren 4761 West Touhy Ave., Lincolnwood, Illinois (312) 679-1100

OHIO, WESTERN PA.: Dwain Holmgren, 4761 West Touhy Avenue, Lincolnwood, Illinois (312) 679-1100

LOS ANGELES 91106: Bruce Berkey, 61 S. Lake Ave., Box 4566, Pasadena, Calif., (213) 681-0685

HOUSTON 77027: Jess Adkins, Vice Pres., Gulf Coast Regional Manager, **Barry Bilkien, Hal Odum,** 4151 Southwest Freeway Suite 115, (713) 626-7850

DALLAS 75202: Ed Sealey, Rusty Meador, George Galloway, 800 Davis Bldg., (214) 748-4403, TWX 910-861-9306

WEST TEXAS: Rusty Meador, P. O. Box 611, Eldorado, Texas 76936 (915) 853-2689

UNITED KINGDOM, NETHERLANDS, SCANDINAVIA: Bryan Clark, Energy Publications Div. HBJ, 24/28 Oval Road, London NW1 7DX, England, (01) 485-7074 (OR 7075). Cable: HARBREX London NW1: Telex: 25775

FRANCE, ITALY, BELGIUM, SWITZERLAND: Gerard Lasfargues, 32, rue Desbordes Valmore, 75016-Paris, France, Telephone: 504 97 94

JAPAN: Mashy Yoshikawa, Orient Echo, Inc., 11th Floor Sankyo Bldg., 7-12 Tsukiji 2-chome, Chuo-ku, Tokyo, Telephone: 541-4923, Cable: MYORIENTECHO

GERMANY, AUSTRIA: S.I.P.A.S., **Wim. J. M. Sanders, Paul J. Verbunt,** Raadhuisstraat 24, P. O. Box 25, 1484 EN Graft-de Ryp, Holland, Telephone 02997-1303 and 3660. Telex: 13039 sipas nl, Telegrams: SIPAS-Amsterdam

Jane Dietz	Production Department Manager
Don Fickert	Graphics Director
Janell Fowler	Production Manager
Debbie Cooper	Production Coordinator
Dennis Howard	Presentation
Laura Page	Presentation
James Duke	Presentation
Kerry White	Presentation

•

Gary Hogan	Business Manager
Jack Schabel	Circulation Director
Royal Courtney	Circulation Fulfillment Manager

EDITORIAL ADVISORY COMMITTEE

Lloyd E. Elkins, Petroleum Consultant
Bennie L. Franks, Senior Vice President, Reserves Management and Technology, Sun Production Co.
Dennis E. O'Brien, Coordination and Planning Manager, Performance Chemicals, Exxon Chemical Americas
B. R. Jones, President, Eagle Production and Drilling Co.
Frank Schuh, Director of Engineering Development, ARCO Oil and Gas Co., a Division of Atlantic Richfield Co.
Marius J. Mes, Senior Research Scientist, Production Research Department, Conoco Inc.

PETROLEUM ENGINEER INTERNATIONAL (USPS 429-380) published 15 times each year, monthly plus March 15, July 15 and November 15, by Energy Publications Division, Harcourt Brace Jovanovich, P.O. Box 1589, Dallas, Texas 75221.

October, 1981, Volume 53, No. 12.

Copyright © 1981 by Harcourt Brace Jovanovich, Inc. All rights reserved. No part of this publication may be transmitted or reproduced in any form or by any means, electronic or mechanical, including photocopy, recording, or any information storage and retrieval system, without permission in writing from the publisher.

Subscription rate to personnel employed by companies involved with exploration, drilling, production, or field processing of oil or gas: one year $12.00, two years $18.00, three years $24.00 for North, Central, and South America. Outside North, Central, and South America: one year $25.00, two years $35.00, three years $45.00. Subscription rate for all others: $25.00 for one year. Single copy price $3.00. Second class postage paid at Duluth, MN and additional mailing offices.

Microfilm copies are available through University Microfilms, International, 300 North Zeeber Road, Ann Arbor, Michigan 48101. Indexed by Applied Science, Technology Index and the Engineering Index, Inc.

HBJ A HARCOURT BRACE JOVANOVICH PUBLICATION

ABP

ABC

Postmaster: Send address changes to PETROLEUM ENGINEER INTERNATIONAL, P.O. Box 1589, Dallas, Texas 75221, USA.

HARCOURT BRACE JOVANOVICH PUBLICATIONS

ROBERT L. EDGELL, Chairman; RICHARD MOELLER, President; LARS FLADMARK, Executive Vice President; ARLAND HIRMAN, Treasurer; JOE BILDERBACH, Vice President; JAMES GHERNA, Vice President; GEORGE GLENN, Vice President; THOMAS GRENEY, Vice President; EZRA PINCUS, Vice President; HARRY RAMALEY, Vice President; ABBOTT SPARKS, Vice President. OFFICES: 757 Third Avenue, New York, N.Y. 10017. Phone (212) 888-4444; 1 East First Street, Duluth, Minnesota 55802. Phone (218) 727-8511. 111 East Wacker Drive, Suite 1730, Chicago, Ill. 60601. Phone (312) 938-2300.

API Credits Economics For Record Drilling Activity

Despite repeated warnings of equipment and labor shortages, the level of drilling activity in the U.S. in 1980 and early 1981 increased at a faster rate than previously thought possible, according to Discussion Paper 024 prepared for the American Petroleum Institute by Donald A. Norman of the Policy Analysis Department.

The paper, "The Response of Drilling Activity to Higher Oil Prices", refutes the belief that "limitations on the physical availability of key inputs constrain the rate at which drilling activity can increase, and, therefore, that increased demand for drilling merely leads to oilfield inflation as drilling contractors bid up the price of these inputs". The paper says, rather, that constraints on increased drilling activity are economic rather than physical in nature.

Although the initial impact of an increased demand for drilling is to raise both the price and the rate of drilling activity, API points out, the longer run allows suppliers time to seek and find economic ways to increase their outputs. Just as the increased demand for drilling creates profit opportunities for those who expand drilling activity, API adds, the increase in demand for drilling inputs provides those who supply the industry the opportunity to profit by expanding their capacities. This process of expansion includes:

- Capacity expansion by existing firms that supply the drilling industry.
- Entry by firms into industries supplying drilling companies.
- Provision of substitute inputs for those whose relative price has increased (and, hence, are viewed as being in short supply.)
- Technological change aimed at creating new substitutes and increasing the productivity of existing equipment.

Average rotary rig activity increased during the period 1971 through 1978 by a compounded annual rate of 12.7%. Activity was down slightly in 1979, but, since then, has increased at an extremely high rate to eclipse drilling records set back in 1955 and 1956.

Typical of new rigs attracted by the improved economics of the petroleum industry is this 25,000-ft rig, the first of 42 new rigs ordered by Continental Drilling Co., a new contractor.

From 1979 to 1980, the total number of wells drilled increased by 22%, while the average number of active rotary rigs increased by 34%. The stock of rigs increased 490 (15.4%).

This jump in drilling activity, API says, was unforeseen by most industry experts because of the widespread belief that expansion would be constrained by the availability of key inputs–including skilled labor for seismic activity and work on drilling rigs, the number of available rigs, oil country tubular goods, and supplies of such other products as drilling mud, cement, and drill bits.

Expansion of the rig fleet has far outpaced the forecasts of industry experts. The increase of 490 rigs from August 1979 to August 1980 represents the largest net increase in the number of rigs ever recorded in one year, and is 33% greater than the previous record, set in 1977. In addition, the increase of 490 rigs in 1980 is almost four times the increase delivered in 1974.

Among factors accounting for the rapid expansion of the number of drilling rigs is an increase in the number of firms building rigs. According to the International Association of Drilling Contractors, there are some 17 firms building rigs today as compared to less than 10 five years ago.

The expansion in wells drilled also reflects the entry of new firms into the drilling industry, API says, quoting an IADC report that the number of drilling firms grew by 110 in 1980. In addition, a number of well servicing contractors are entering the drilling industry.

In answering the question, "At what rate might the stock of rigs grow in the future?", the API report cites a recent estimate that the rig fleet now is expanding at the rate of 90 rigs per month, or 1,080 per year. This is consistent with the implications of the Institute's economic versus physical theory. The higher prices paid for rigs induces capacity expansion by existing rig builders, entry by new builders (domestic and foreign), and substitution (of modified service rigs, for example). Constraints on the number of rigs, therefore, proved to be short-lived, and the future rate at which new rigs are supplied appears chiefly to be a matter of the economics of such expansion.

Tubular Goods

Despite concerns expressed in early 1980 about the availability of various oil country tubular goods, U.S. mills last year produced 3,613 million tons of drill pipe, casing, and tubing for the oil industry. This represents an increase of 47% over the 2,458 million tons produced in 1979. Here, again, the response to an increase in demand was far more rapid than knowledgeable observers expected.

Imports are up also. In 1979, 497,000 tons were imported. In 1980, imports were up to about 1.3 million tons. This year, imports are expected to reach 2 million tons.

Other responses to the increased drilling activity and, therefore, demand for tubular goods, include the substitution of aluminum for steel drill pipe, the use of non-API rated pipe in some shallow wells, and recovery of used tubulars from abandoned wells.

The API report points out that the supply of tubular goods rapidly responded to the increased demand, as did the supply of rigs. Although certain specialty items may have increased less rapidly, API says there is no evidence that the overall level of drilling activity has been constrained by the lack of tubular goods. In fact, concern recently was expressed about possible overexpansion of tubular goods production capacity.

Skilled Labor

A third major input generally identified as a possible constraint on increased drilling activity is skilled labor. API, however, points to data on enrollments in university departments offering degrees in petroleum engineering as suggesting that students are responding to starting salaries that are relatively high.

The Society of Petroleum Engineers surveyed 19 universities and found that there were 536 graduates there with BS degrees in petroleum engineering in 1978. The universities forecast 952 such graduates in 1982–an increase of 77.6%.

With respect to drilling crews, API points out that concern over the lack of trained personnel is nothing new. Several years ago, for example, industry observers questioned whether the industry would come up with enough crews to sustain an active rig count of 3,000. According to the IADC, however, the number of drilling crews in the past 10 years has expanded from about 3,000 to almost 15,000. This represents an average growth rate of 17.5%.

Drilling Results

The most recent data available on additions to crude oil reserves indicate that increased drilling activity is showing some results. In 1979, the total of new discoveries, revisions of previous estimates, and extensions of existing fields was 2.2 billion bbl – up from 1.3 billion bbl reported in 1978. Additions to oil reserves in 1979 from new field discoveries were the highest since 1970, when the Alaskan reserves were recorded.

TABLE 1. Additions to crude oil reserves, 1971 to 1979; crude oil production in lower 48 states, 1971 to 1981

	Total of discoveries, revisions, and extensions, thousands of bbl	New field discoveries, thousands of bbl	Crude oil production in lower 48 states,* thousand b/d	Percentage change in production from previous year, thousand b/d
1971	2,317,732	91,469	9,460	−1.87
1972	1,557,848	123,210	9,440	−0.21
1973	2,145,831	116,097	9,010	−4.56
1974	1,993,573	226,163	8,581	−4.76
1975	1,318,463	173,177	8,184	−4.63
1976	1,085,291	67,842	7,959	−2.75
1977	1,403,780	159,950	7,781	−2.24
1978	1,347,256	199,994	7,478	−3.89
1979	2,205,673	239,406	7,151	−4.37
1980	N.A.	N.A.	6,980	−2.39
1981 (Jan.-March)	N.A.	N.A.	6,956	−0.34

* Includes lease condensate

Also, the increase in discoveries may be responsible for a recent slowdown in the rate of decline of crude oil production in the lower 48 states.

In conclusion, the API report says there is a great deal of evidence that drilling activity is highly responsive to changes in the relative profitability of oil production. Despite repeated warnings about physical shortages of equipment and skilled personnel, drilling activity continues to increase.

This suggests, API says, that the notion of physical shortages as a constraint to increased drilling is invalid. What constrains drilling activity is its economics.

International Count Up By Baker's Dozen

The international rotary rig count, led by a 13-rig gain in Latin America, was up by just that number of rigs in July as compared with June, and was 67 rigs higher than the same month in 1980.

The report, prepared each month by Hughes Tool Co., Houston, Tex., indicates that all of Latin America's increase can be credited to land rigs, of which the region has 436–197 of them in Mexico.

The only other regions registering gains during the month are the Middle East and South Pacific. The Middle East, led by Abu Dhabi, added nine land rigs, while Australia's two additional offshore rigs accounted for the South Pacific increase.

Hughes Tool Co.
International Rotary Drilling Rig Report
Summary

	July 1981	June 1981	July 1980
Africa	214	214	216
Europe	204	209	178
Far East	244	248	225
Latin America	522	509	475
Middle East	167	160	195
South Pacific	24	22	19
Total	1,375	1,362	1,308
China (Offshore)	4	13	13

	July 1981			June 1981		July 1980	
	Land	Offshore	Total	Land	Offshore	Land	Offshore
Algeria	98	0	98	98	0	111	0
Angola	0	4	4	0	4	1	4
Cameroun	0	8	8	0	8	0	4
Gabon	5	8	13	5	8	2	7
Libya	31	2	33	31	2	38	2
Morocco	4	0	4	4	0	1	1
Chad	1	0	1	1	0	1	0
Nigeria	15	5	20	15	5	15	5
Rep. of Congo	2	5	7	2	5	0	4
Rep. of Zaire	1	0	1	1	0	1	0
Tunisia	8	3	11	8	3	5	2
Niger	5	0	5	5	0	5	0
Ivory Coast	0	4	4	0	4	1	2
South Africa	0	2	2	0	2	0	2
Sudan	3	0	3	3	0	2	0
Total: **Africa**	173	41	214	173	41	183	33

(continued)

Exxon Releases Data On Pt. Thomson Wells

Exxon Co. U.S.A. recently released test results of two additional Exxon-operated wells on the Point Thomson Unit 50 miles east of Prudhoe Bay, Alaska.

Point Thomson Unit well No. 3 was completed in 1979 at a total depth of 14,125 ft. In a test below 13,500 ft, the well tested 6.3 MMcfd of gas and 476 b/d of 18° API gravity condensate.

Point Thomson Unit well No. 4 was completed in 1980 at a total depth of 15,074 ft with no significant amounts of hydrocarbons being found.

The two wells are among six drilled by Exxon in the Flaxman Island-Point Thomson area. Five of the wells have tested significant quantities of oil or gas.

The Point Thomson Unit No. 3 well was drilled by Exxon, Mobil, Phillips, and Chevron in the eastern part of the Exxon-operated Point Thomson Unit. The No. 4 well was drilled by Exxon, Mobil, Phillips, and Aquitaine 6 miles west of the No. 3 in the northwestern portion of the 40,000-acre unit.

Exxon plans to drill two additional wells this winter in the area.

Terra Discovery Southwest of Alva

Terra Resources Inc. has discovered an oil and natural gas field in Woods County, Oklahoma, approximately 13 miles southwest of Alva.

The No. 1 Eckels flowed 140 b/d of oil, 10 b/d of water, and 300 Mcfd of natural gas through an 11/64-in. choke with 950-psi flowing tubing pressure. Production was from the Hunton between 6,529 and 6,533 ft. Log analysis also indicates probable gas pay in the Mississippian.

The discovery is located 5 miles west of Hunton production in the Avard N. W. field and 2 miles northwest of Hunton production in the Cora field. Proposed name of the new structure is North Teagarden field.

Reading & Bates Joins Colombia Drilling

Reading & Bates Petroleum Co. has signed an exploration and development contract with Sunray Colombia Oil Co. for exploration in the San Marcos block of Colombia.

The seismic program on the 225,000-acre block has been completed, and drilling of the first exploratory well will commence in October 1981, to an estimated total depth of 11,800 ft.

Sunray, headquartered in Dallas, will be the operator, with 37.5% working interest in the project.

	July 1981			June 1981		July 1980	
	Land	Offshore	Total	Land	Offshore	Land	Offshore
Austria	10	0	10	8	0	8	0
Belgium	0	0	0	0	0	1	0
Denmark	0	2	2	0	2	3	0
France	15	2	17	15	2	10	1
Germany	24	0	24	23	1	21	0
Greece	3	3	6	3	3	1	2
Holland	9	6	15	9	6	6	11
Ireland	0	0	0	0	0	0	2
Italy	25	7	32	25	7	7	9
Norway	0	12	12	0	12	0	9
Portugal	1	0	1	1	0	0	0
Switzerland	1	0	1	1	0	1	0
Spain	5	1	6	8	2	7	4
United Kingdom	5	51	56	4	55	3	50
Yugoslavia	22	0	22	22	0	22	0
Total: **Europe**	120	84	204	119	90	90	88
Bangladesh	5	0	5	5	0	3	0
Brunei	1	6	7	1	6	1	7
Burma	31	0	31	31	0	25	0
India	37	7	44	37	7	37	6
Indonesia	59	27	86	60	25	57	19
Japan	11	2	13	15	2	13	3
Korea	0	0	0	0	0	0	0
Malaysia	0	12	12	0	13	1	10
Maldives	0	0	0	0	0	0	0
North Korea	0	0	0	0	0	0	0
Pakistan	14	0	14	16	0	14	0
Philippines	10	3	13	8	3	10	3
Thailand	3	4	7	2	5	1	3
Taiwan	11	1	12	11	1	10	2
Vietnam	0	0	0	0	0	0	0
Total: **Far East**	182	62	244	186	62	172	53
P.R. of China		4			13		13
Argentina	68	3	71	65	3	69	0
Barbados	1	0	1	0	0	0	0
Bolivia	11	0	11	10	0	4	0
Brazil	53	29	82	52	31	38	38
Guatemala	7	0	7	5	0	3	0
Chile	4	4	8	3	4	4	3
Colombia	19	0	19	16	0	11	1
Ecuador	4	0	4	3	0	3	0
Mexico	197	20	217	197	20	193	23
Paraguay	0	0	0	0	0	0	0
Peru	18	6	24	18	5	16	5
Trinidad	8	7	15	8	6	9	5
Uruguay	0	0	0	0	0	0	0
Venezuela	46	17	63	46	17	36	14
Total: **Latin America**	436	86	522	423	86	386	89
Abu Dhabi	18	16	34	10	18	5	19
Bahrain	1	0	1	1	0	1	0
Dubai	0	2	2	0	2	1	2
Egypt	11	16	27	11	16	10	17
Iran	0	0	0	0	0	0	0
Iraq	5	0	5	5	0	39	0
Kuwait	3	0	3	3	0	3	0
Neutral Zone	0	0	0	0	0	0	0
Oman	10	0	10	9	0	8	0
Qatar	3	4	7	4	4	4	4
Ras Al Khaimah	1	0	1	1	0	1	0
Saudi Arabia	16	15	31	16	15	15	10

(continued)

	July 1981			June 1981		July 1980	
	Land	Offshore	Total	Land	Offshore	Land	Offshore
Sharjah	2	1	3	1	1	1	0
Syria	16	0	16	16	0	15	0
Turkey	26	0	26	26	0	40	0
Umm Al Qaiwain	1	0	1	1	0	0	0
Total: **Middle East**	113	54	167	104	56	143	52
Australia	19	4	23	19	2	10	7
New Zealand	0	1	1	0	1	1	0
Papua New Guinea	0	0	0	0	0	1	0
Total: **South Pacific**	19	5	24	19	3	12	7

Tosco Studying Moroccan Shale

Tosco Corp. and the French bank Paribas (Banque de Paris et des Pays-Bas, S.A.) have signed a contract with Morocco to perform an 18-month feasibility study leading to commercial development of Moroccan oil shale deposits at Timahdit.

The agreement with the new Moroccan energy agency, Onarexh, provides Tosco and Paribas with the right to participate in the development of a full-scale oil shale project at Timahdit if the feasibility study recommends immediate commercial-scale development.

The Timahdit deposit is located in the Middle Atlas Mountains south of the city of Fez. The region contains several billion tons of oil shale averaging approximately 25 gal/ton.

The Tosco-Paribas study of the Timahdit oil shale deposit will include: mining alternatives; use of the Tosco II process to recover the oil; oil upgrading, refining, transportation, and marketing plans; environmental and socioeconomic studies; and economic and financial analyses for a commercial oil shale project.

Onshore Licenses Awarded In Britain

Ten petroleum exploration licenses covering onshore areas in Scotland and England were awarded in June by David Howell, Secretary of State for Energy.

The licenses authorize the holders to search for oil and gas only by prospecting and geological survey, including drilling to a depth of not more than 1,150 ft to obtain geological information. They do not confer the right to drill for or to produce petroleum.

The first license – 151, covering 37 sq miles in Fife – was issued to North Sea Petroleums Ltd. The next two licenses were issued to a group headed by RTZ Oil and Gas Ltd. They cover 97 sq miles in South Yorkshire, Humberside, Lincolnshire, and Nottinghamshire, and 53 sq miles in Nottinghamshire.

Licenses 154 and 155 were issued to Bearcat Explorations (UK) Ltd. for 304 sq miles in Gloucestershire and Wiltshire and 310 sq miles in Gloucestershire and Oxfordshire.

License 156, covering 186 sq miles in Wiltshire, went to a group headed by Voyager Petroleums (UK) Ltd.

British Sun Oil Co. Ltd. heads a group that was awarded licenses 157 and 158 covering 164 sq miles in Wiltshire, Oxfordshire, and Berkshire, and 310 sq miles in Berkshire, Oxfordshire, and Hampshire.

Licenses 159 and 160 went to a Carless Exploration Ltd. group, and they cover 310 sq miles in Avon and Somerset plus 308 sq miles in Avon, Somerset, and Wiltshire.

Philippine Discovery Taps Subsea Sandstone

Philippines-Cities Service Inc.'s latest oil discovery offshore Palawan Island in the Republic of the Philippines flowed 1,850 b/d of 35.3° API oil on a ¾-in. choke from perforations of 7,338-64 ft. Wellhead pressure was 275 psi.

Another drillstem test near the top of the same reservoir, at 7,255-85 ft, also flowed at about 1,800 b/d through a ¾-in. choke with a wellhead pressure of 318 psi.

Located in 1,100 ft of water, the well, Galoc-1, is the first indicated discovery to be produced from a sandstone reservoir in the Philippines offshore. The Nido, Matinloc, and Cadlao oil strikes are all in reefal limestone reservoirs. Galoc-1, drilled to a depth of 12,141 ft, is the northernmost oil found in the Philippines to date. It is situated 75 miles northeast of the Nido field, 40 miles northeast of the Matinloc field, and 50 miles northeast of Cadlao.

Barringer, Merit Drilling in Kentucky

Barringer Resources Inc. of Denver and Toronto has signed an agreement with Merit Resources Corp. and Assoicates of Glen Rock, N. J., and Tulsa for a two-phase oil and gas exploration program covering initially up to 10,000 acres of leases held by Merit in south-central Kentucky.

Dr. Anthony R. Barringer, president of Barringer Resources, said his exploration and research firm will use a combination of geological, geophysical, and geochemical methods to select up to 10 drill sites to be drilled by Merit. Depending upon success of the first phase, Merit has the option to substantially expand the program to include addditional acreage, Barringer said.

Joint Discovery In Liberty County

Texaco U.S.A. and Inexco Oil Co. have discovered natural gas and condensate in an exploratory well drilled near Liberty, Tex., about 45 miles east of Houston.

Drilled to a total depth of 17,500 ft, the Texaco Boyt Heirs No. 1 well tested 5.2 MMcfd of gas and 120 b/d of condensate through a 10/64-in. choke from perforations below 16,000 ft in the Yegua formation, with flowing tubing pressure of 10,694 psi.

The discovery is located 14 miles southwest of Texaco's Nome Northeast field, discovered in 1980, which also produces gas and condensate from the Yegua formation.

Steam Drilling Makes Comeback

Meeting today's high rig demand with a page from the past, D&R Drilling Co. of Odessa, Tex., has put together a steam-powered drilling rig from both spare and new parts and is using it to drill a 14,800-ft well for Border Exploration Co.

The well, Amigo State No. 18-1, is located in Ward County, Texas, 5 miles northwest of Grandfalls and 15 miles southwest of Monahans.

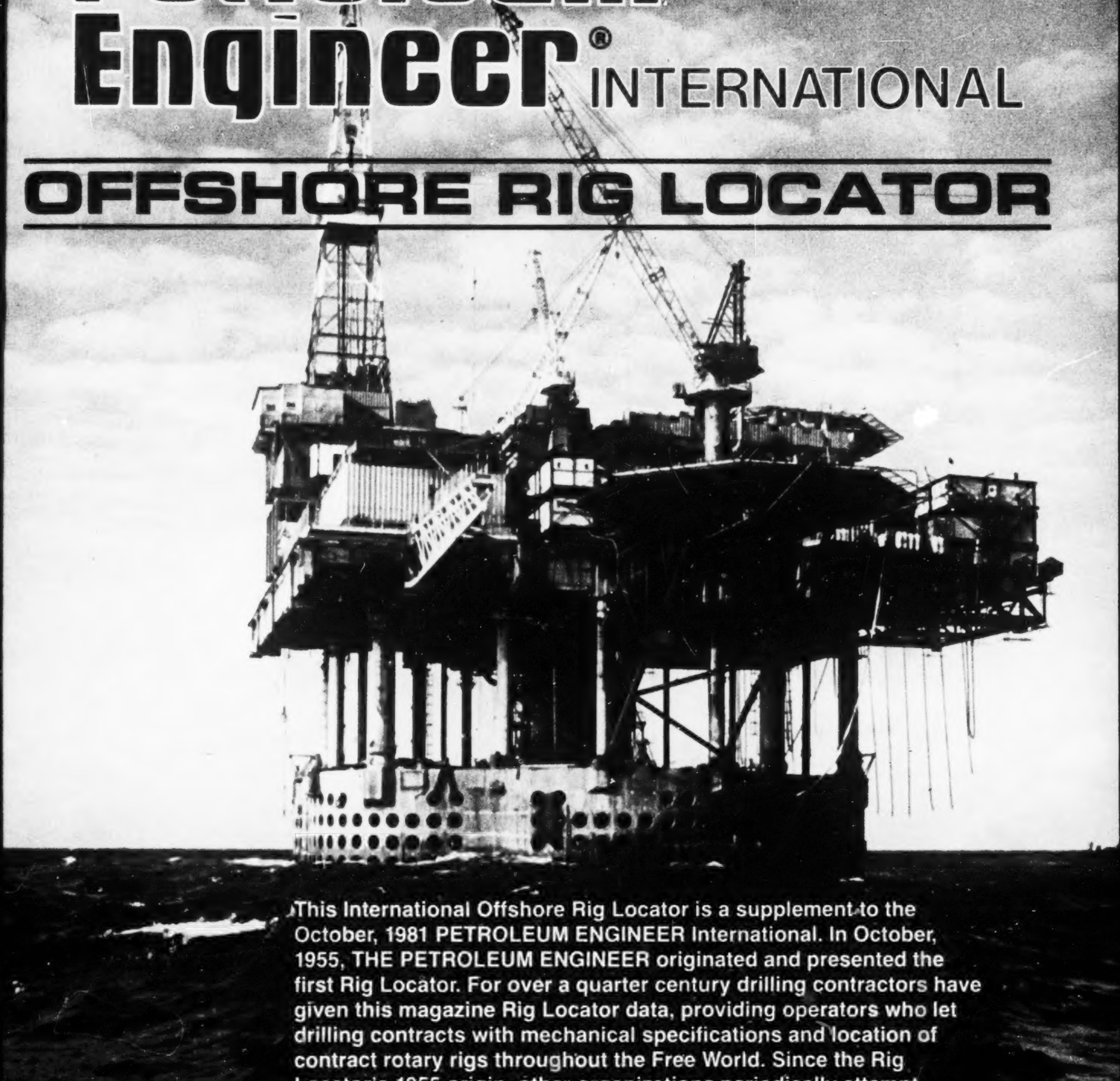
Ed Durrett, president of D&R Drilling, explains the philosophy behind the innovative rig, "We noticed that other rig companies were putting tremendous investments of time and money into trying to make electric rigs provide the flexibility and advantages of the steam rigs of yesteryear. We thought a better approach would be to modify old steam engines and rigs to take advantage of the new technologies developed in the diesel-powered rigs and still use steam as our primary power source."

The new rig, which took 6 months to assemble, is composed of approximately 60% new parts and 40% old. Most of the old parts were found in Louisiana, where steam drilling had been most popular.

"The old parts, which, of course, include the steam engine, were recon-

Petroleum Engineer® INTERNATIONAL

OFFSHORE RIG LOCATOR



This International Offshore Rig Locator is a supplement to the October, 1981 PETROLEUM ENGINEER International. In October, 1955, THE PETROLEUM ENGINEER originated and presented the first Rig Locator. For over a quarter century drilling contractors have given this magazine Rig Locator data, providing operators who let drilling contracts with mechanical specifications and location of contract rotary rigs throughout the Free World. Since the Rig Locator's 1955 origin, other organizations periodically attempt similar concepts, even the title, while others shuffle and republish PEI Rig Locator data. This Rig Locator in your hands, detailing 889 offshore rigs, is the most complete presentation of contract offshore drilling rigs ever published. There are 117 more rigs in this International Offshore Rig Locator than were published in the Fall of 1980.

Petroleum Engineer® INTERNATIONAL

Fall 1981 International

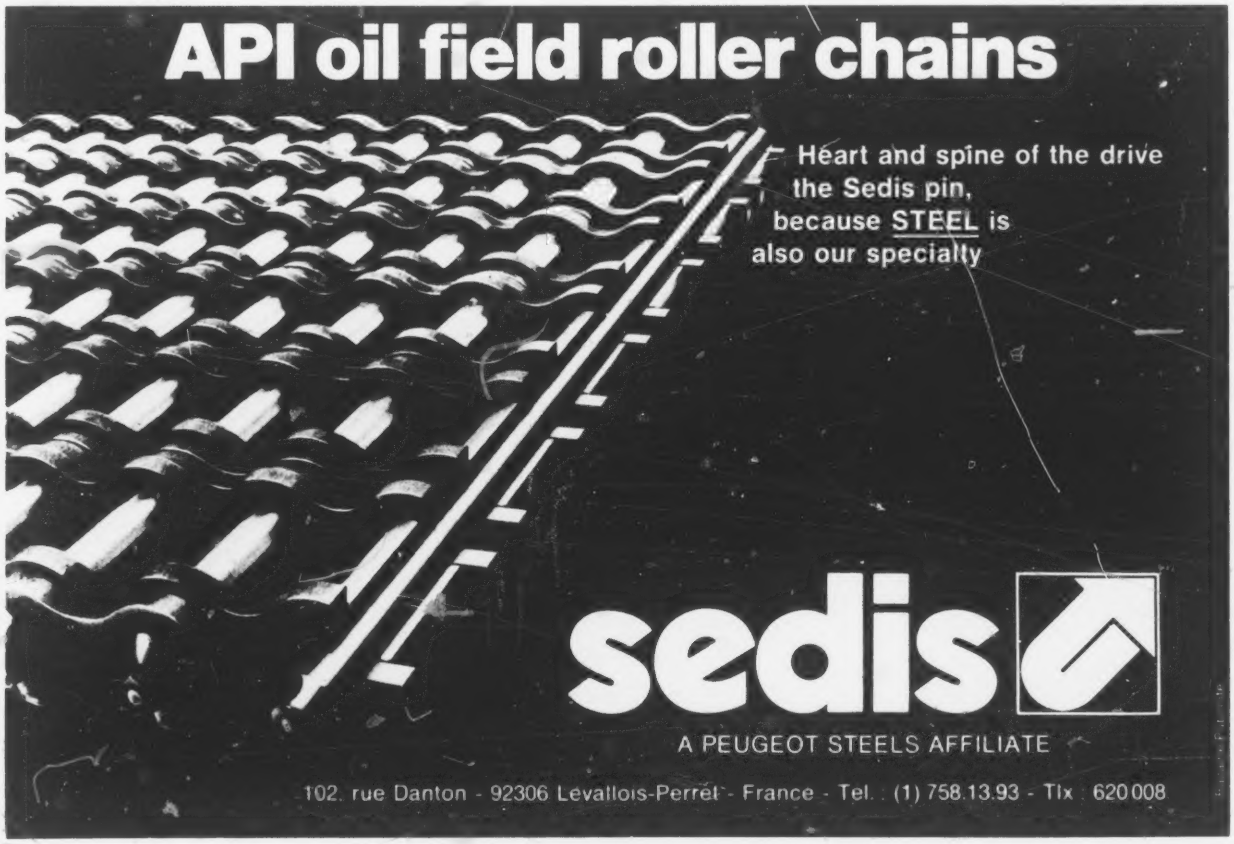
OFFSHORE RIG LOCATOR

The CDP1 drilling and production platform at the Frigg field on the border line of the British and Norwegian sectors of the North Sea is topped by a Saipem drilling rig.

DRAWWORKS MANUFACTURERS

ABBREVIATIONS

Bethlehem Supply Co.	Beth
Cabot Corporation Machinery Division	Cabot/Franks
Continental-Emsco Co.	EMSCO
Gardner-Denver	Gar-Den
Howard-Turner Machine Works	Howard-Turner
Hydra Rig inc.	Hydra
Ideco Inc.	Ideco
Mid-Continent Supply	M-CSCO
National Supply	Natl
OIME	OIME
OILWELL Div. (U.S. Steel)	OILWELL
Pool Company	Pool
Skytop/Brewster	Brwstr
Unit Rig Company	Unit
Wilson Manufacturing Co. Inc.	Wlsn


API oil field roller chains
Heart and spine of the drive
the Sedis pin,
because STEEL is
also our specialty
sedis
A PEUGEOT STEELS AFFILIATE
102. rue Danton - 92306 Levallois-Perret - France - Tel.: (1) 758.13.93 - Tlx : 620008

Circle 305 on Reader Service Card

Petroleum Engineer® INTERNATIONAL

International Offshore Drilling Contractors

AMOSHORE DRLG CO P O Box 2765 Houston TX 77001 713-871-7500
ANDERSON-BARNETT DRLG CO 603 Pujo St Lake Charles LA 70601 318-433-6907
ARABIAN DRLG CO 20 Avenue Rapp 75-Paris-7 France 555-9534
ASSOCIATED MARINE SERV INC 819 Fairview Pl N Seattle WA 98109 206-624-4122
ATLANTIC DRLG CO LTD 14 Tothill St London SW1H 9NB England 01-222-8511
ATLANTIC PACIFIC MARINE CORP 2425 Fountain View Dr Ste 300 Houston TX 77057 713-783-0910
ATWOOD OCEANICS INC P O Box 218350 Houston TX 77218 713-492-2929
BAWDEN DRLG (UK) LTD Farbur Industrial Estate Dyce Aderdeen Scotland AB2 0PB 724399
BAWDEN DRLG INC 10200 Richmond Ave Houston TX 77042 713-974-3131
BLOCKER DRLG & MARINE CO U S Hwy 90 E Lafayette LA 70505 318-269-0730
BOKENKAMP DRLG CO 3131 Briar Park Dr Ste 1050 Houston TX 77042 318-232-0677
BOOKER DRLG P O Box 7244 Metairie LA 70011 504-833-2876
BP PETROLEUM DEV LTD Britannic House-Moor Lane London EC2 England
BROUGHTON DRLG CO 921 Main St Ste 1410 Houston TX 77002 713-759-1844
CRC MALLARD WELL INC P O Drawer 51498 OCS Lafayette LA 70505 318-233-4922
CACTUS INTL INC 13747 Monfort Dr Ste 300 Dallas TX 75240 214-934-3333
CANADIAN MARINE DRLG LTD P O Box 200 Calgary AB Canada T2P 2HB 403-266-7611
CHILES DRLG CO 1900 West Loop South Ste 1400 Houston TX 70027 713-621-4991
CIRCLE BAR DRLG CO 2-3-4 Loyola Bldg Ste 505 New Orleans LA 70112 504-581-5502
CLIFFS DRLG CO 2-Allen Center Ste 3150 Houston TX 77002 713-651-9426
COSIFOR 90 Avenue des Ternes 75017 Paris France 574 35 79
DAN-TEX INTL INC 10575 Katy Fwy Ste 260 Houston TX 77024 713-932-1213
DEUTSCHE TIEFBOHR AG Postfach 75 4444 Bentheim West Germany
DIAMOND M CO P O Box 1089 Morgan City LA 70112 504-384-3540
DIAMOND M CO P O Box 22738 2121 Sage Rd Houston TX 77027 713-623-8660
DIXILYN-FIELD DRLG CO P O Box 4251 Houston TX 77210 713-877-8850
DOLPHIN INTL INC 333 Clay St Ste 2600 Houston TX 77002 713-659-2381
DUAL MARINE DRLG CO P O Box 240 Wichita Falls TX 76307 817-723-2127
DUAL OFFSHORE P O Box 240 Wichita Falls TX 76307 817-723-2127
DYVI OFFSHORE A/S P O Box 1662 Vika Oslo 1 Norway 02 247681
EAGLE OFFSHORE DRLG SERV INC 3626 N Hall St Dallas TX 75219 214-521-0021
EGYPTIAN DRLG CO P O Box 71 Nasr City Cairo Egypt 600-230
FEARNLEY OFFSHORE P O Box 1158 Oslo Norway 410020
FLUOR DRLG SERV INC 3333 Michelson Dr Irvine CA 92730 714-975-7000
FLUOR DRLG SERV 144 Elk Pl #1010 New Orleans LA 70112 504-581-5333
FORAMER 16 Bis Ave Grange Dame Rose 78140 Velizy-Vellacoublay France 3 94697-17
FOREX NEPTUNE AND/OR AFFILIATES 20 Ave Rapp BP 111-07 75326 Parix Cedex 07 France 555-95-34
GLENDEL DRLG CO P O Box 765 Abbeville LA 70510 318-898-1637
GLOBAL MARINE DRLG CO P O Box 4379 7500 San Felipe Houston TX 77210 713-978-4100
GOLAR-NOR OFFSHORE A/S 103 New Oxford St Ste 16 London WCIA 1DQ England 01-836-9545
GOLDRUS MARINE DRLG CO 900 First City Natl Bank Bldg Houston TX 77002 713-658-9271
HARRIS WELL SERV INC P O Drawer 949 Eunice LA 70535 318-457-3376
HELMERICH & PAYNE INTL DRLG Utica at 21st Tulsa OK 74114 918-742-5531
HOUSTON OFFSHORE INTL INC 4543 Post Oak Pl Ste 208 Houston TX 77027 713-629-1400
HUTHNANCE DRLG CO 601 Jefferson St Ste 500 Houston TX 77002 713-659-4816
INTERNATIONAL CHANDLERS 1910 N Akard Cumberland Hill Dallas TX 75201 214-653-8855
INTEROCEAN DRLG SA P O Box 2765 Houston TX 77001 713-871-7500
JAPAN DRLG CO LTD No 11 Mori Bldg Tokyo Japan 501-7391
J L OFFSHORE DRLG A/S 10575 Katy Fwy Ste 260 Houston TX 77024 713-932-1213
KCA DRLG LTD KCA House Hammersmith 227 Shepherds Bush Road London England W6 7AS 01-741-4811
KEYDRIL CO 2000 Capital Natl Bank Plaza Houston TX 77002 713-750-3111
KEYES OFFSHORE INC 2425 Fountainview Dr Ste 220 Houston TX 77057 713-785-4010
KEY INTL DRLG CO LTD 2000 Capital Natl Bank Plaza Houston TX 77002 713-750-3111
KINGSWORTH MARINE DRLG LTD 53 Leadenhall St London EC3A 2BP England 01-481-2020
LIVINGSTON OILWELL SERV INC P O Box 2166 Houma LA 70361 504-868-1430
LOFFLAND BROS CO P O Box 2847 Tulsa OK 74101 918-622-9330
MAERSK DRLG Esplanaden 50 DK-1098 Copenhagen Denmark 45-1-14-15-14
MARINE DRLG CO 900 Corpus Christi Natl Bank Bldg Corpus Christi TX 78401 512-884-8851
MARINE DRLG SA 1910 N Akard Cumberland Hill Dallas TX 75201 214-653-8855
MARLIN DRLG CO P O Box 51887 OCS Lafayette LA 70505 318-837-2781
MATAGORDA DRLG CO P O Box 10307 Corpus Christi TX 78410 512-883-7471 512-888-4213
MAYRONNE CO P O Box 432 Harvey LA 70059 504-368-5911
MERIT DRLG CO 14811 St Mary's Lane Ste 148 Houston TX 77079 713-493-1001
MGF DRLG CO 2626 Richmond Ave Ste B Houston TX 77098 713-526-7336
MORAN DRLG CORP 262 N Belt Ste 300 Houston TX 77060 713-820-1865
MORAN DRLG LTD 262 Northbelt Houston TX 77060 713-820-1865
NATIONAL DRLG CO P O Box 4017 Abu Dhabi UAE 820-330
NICKLOS DRLG CO 518 First City Natl Bank Bldg Houston TX 77022 713-658-8245
NOBLE DRLG CORP 1924 S Utica Ste 600 Tulsa OK 74104 918-749-9901
NORDIC OFFSHORE DRLG CO P O Box 1374 Vika Oslo 1 Norway
OCEAN DRLG & EXPL CO P O Box 61780 New Orleans LA 70161 504-561-2811
ODFJELL DRLG & CONSULTING CO P O Box 25 5032 Minde Norway 05-2882200
OFFSHORE CO P O Box 2765 Houston TX 77001 713-871-7619
PANCNORSE DRLG CORP P O Box 1401 Orange CA 92668 915-367-4181
PENROD DRLG CO 1407 Main St Dallas TX 75202 214-651-0187
PERFORACIONES ALTA MAR CA Apartado No 1641 Maracaibo Venezuela
PERFORADORA MEXICO SA Insurgentes 432 9th Floor Mexico City 7 Mexico D F
PHOENIX MANAGEMENT CORP 10500 Westoffice Dr Houston TX 77042 713-784-2420
PLATFORM WELL SERV INC P O Box 53836 Lafayette LA 70505 318-237-5555
POOL ARABIA LTD P O Box 4271 Houston TX 77210 713-780-4999
POOL AUSTRALIA INC P O Box 4271 Houston TX 77210 713-780-4999
POOL CO AFFILIATES P O Box 4271 Houston TX 77210 713-780-4999
POOL-INTAIRDRIL LTD P O Box 4271 Houston TX 77210 713-780-4999
POOL OFFSHORE P O Box 4271 Houston TX 77210 713-780-4999
POOL SANTANA LTD P O Box 4271 Houston TX 77210 713-780-4999
READING & BATES DRLG CO 901 Threadneedle Ste 200 Houston TX 77079 713-496-5000
REBSTOCK DRLG CO 2601 Lexington Ave Kenner LA 70062 504-467-1321
RESOURCE DRLG INC 1908 S Post Oak Houston TX 77056 713-871-8550
RICHTER DRLG PTY LTD GPO Box 2197 Brisbane Queensland Australia 4001 229-2544
RIO COLORADO S A Sarmiento 663 Buenos Aires Argentina 713-840-0044
ROSS DRLG CO P O Box 265 3201 Sandefjord Norway 34-63481
ROWAN COMPANIES INC-US 5051 Westheimer Ste 1900 Houston TX 77056 713-621-7800
ROWAN INTL INC 5051 Westheimer Ste 1900 Houston TX 77056 713-621-7800
SAIPEM SpA S Donato Milanese Milano Italy 02/5201
SALEN PROTEXA DRLG CO 11777 Katy Fwy Ste 300 South Bldg Houston TX 70079 713-496-7770
SALVESEN OFFSHORE DRLG LTD 50 E Fettes Ave Edinburgh Scotland
SANTA FE DRLG CO 505 S Main St Orange CA 92668 714-558-1300
SEACREST DRLG CO 1704 Shaw Centre Scotts Rd Singapore 0922 Republic of Singapore 7377633
SEA DRLG NETHERLANDS 1910 N Akard Cumberland Hill Dallas TX 75201 214-653-8855
SEDCO DUBAI LTD 1901 N Akard Dallas TX 75201 214-653-8855
SEDCO ESPANNA SA 1901 N Akard Cumberland Hill Dallas TX 75201 214-653-8855
SEDCO INC 1910 N Akard Cumberland Hill Dallas TX 75201 214-653-8855
SEDCO INTL S A P O Box 833 Tehran Iran 687742-687756 & 687816
SEDCO MARITIME INC 1910 N Akard Cumberland Hill Dallas TX 75201 214-653-8855
SEDCO-OVERSEAS DRLG LTD 1901 N Akard Cumberland Hill Dallas TX 75201 214-653-8855
SERVICE EQUIPMENT & ENGRG INC 900 Dunn St Houma LA 70360 504-868-9010
SHANK DEAN DRLG CO 2908 Engineers Rd Belle Chasse LA 70037 504-392-1685
SKINNER MARINE OPERATIONS LTD P O Box 46 San Fernando Trinidad West Indies 65-77265
SMEDVIG DRLG CO Vergsgt 13 P O Box 110 4001 Stavanger Norway 045-20040
SOUTHEASTERN DRLG SERV INC 1910 N Akard Cumberland Hill Dallas TX 75201 214-653-8855
SOUTHEASTERN OCEAN DRLG CO SA 1910 N Akard Cumberland Hill Dallas TX 75201 214-653-8855
SOUTH SEAS DRLG CO P O Box 1401 Orange CA 92668 714-558-1300
STAVANGER DRLG A/S P O Box 51 Skansegt 9 4001 Stavanger Norway 4745-32010
TELEDYNE MOVIBLE OFFSHORE INC P O Box 51936 OCS Lafayette LA 70505 318-232-5120
TEMPLE DRLG CO 3300 Capital Bank Plaza Houston TX 77002 713-759-0960
TRANSOCEAN DRLG CO LTD P O Box 25861 Oklahoma City OK 73125 405-270-1313
TRANSWORLD DRLG 2700 S Post Oak Ste 2460 Houston TX 77056 713-629-0720
TRANSWORLD DRLG CO P O Box 25861 Oklahoma City OK 73125 405-270-1313
TROPIC DRLG & EXPL CO 17150 Butte Creek Ste 200 Houston TX 77090 713-44-3970
TWO R DRLG CO P O Box 1968 Houma LA 70361 504-876-6987
UNDERWATER GAS DEV LTD P O Box 428 Port Colborne ON L3K 1B7 Canada 416-492-5148
VON RAUTENKRANZ HERMANN INTERNATIONALE TIEFBOHR GmbHa Co KG ITAG D-3100 Celle Germany
WELL SERVICES LTD P O Box 152 San Fernando Trinidad West Indies 649-7531
WESTERN OCEANIC INC 515 S Post Oak Ste 1200 Houston TX 77027 713-629-2700
WHELESS DRLG CO 920 Commercial Natl Bank Bldg Shreveport LA 71101 318-222-3137
WILH WILHELMSEN Roald Amundsens Gate 5 Oslo 1 Norway
WILSON BROS DRLG CO P O Drawer 53628 Lafayette LA 70505 318-233-5950
ZAPATA OFFSHORE CO P O Box 4240 Houston TX 77001 713-266-6000

International Contract Offshore Drilling Rigs

Contractor	Rig name or no.	Type	BOP Stack		Drwwks make & model	Rated drlg depth with 4½ in. pipe	Water Depth		Location	Status
			Size (ID)	Pressure rating			Rated	Current		
					AFRICA					
UNDESIGNATED										
Cosifor	Navifor III	Tender	16.75	5000	National 1320-UE	20,000	600			Under Construction
ANGOLA										
Sedco	Sedco 135-G	Semisubmersible	21.25	10000	OILWELL 3000	25,000	800	31	Soyo	Drilling
ARMADAH										
Western Oceanic	Nike I	Jackup	13.63	10000	National 1320	20,000 5"	150			Under Construction
CAMEROON										
Chiles Drlg	Texas Star	Jackup	13.63	1000	National 110-UE	16,000	150	85	Kribi	Testing
Cosifor	Navifor I	Tender	16.75	5000	National 1320-UE	20,000	600			Working
	Navifor II	Tender	13.63	5000	National 1320-UE	20,000	600			Working
Diamond M	Barge 45	Barge-Posted	13.63	10000	OILWELL 3000	25,000	22		West Africa	Drilling
Foramer	Ile de la Reunion	Tender	13.63	5000	National 110-DE	16,000	250		Gulf of Guinea	Elf Serepca

Contractor	Rig name or no.	Type	BOP Stack		Drwwks make & model	Rated drlg depth with 4½ in. pipe	Water Depth		Location	Status
			Size (ID)	Pressure rating			Rated	Current		
					AFRICA (Cont'd)					
CAMEROON (Contd)										
Forex-Neptune	Neptune 7 Pentagone 81	Semisubmersible	13.63	10000	National 1320-UE	24,000	660	660		Drilling
	Pentagone 82	Semisubmersible	18.75	10000	EMSCO C3-UE	20,000/5"	1050	1050		Drilling
	Trident 7A	Jackup	13.63	10000	Gar-Den 1500-E	21,700	132	132		En Route
Reading & Bates Drlg	Douglas Carver	Drillship	20.00	10000	National 1625-DE	25,000	750			Contracted-AGIP
Western Oceanic	Western Polaris II	Jackup	13.63	10000	National 1320-UE	20,000/5"	250		Gabon	Contracted-Elf
CONGO										
Foramer	Ile de Re	Tender	16.75	5000	National 1320-DE	20,000	300		Gulf of Guinea	Elf Congo
	Ile de Sein	Tender	16.75	5000	National 1320-DE	20,000	400		Gulf of Guinea	Elf Congo
	Ile D'Yeu	Tender	16.75	5000	National 1320-DE	20,000	400		Gulf of Guinea	Elf Congo
Reading & Bates Drlg	Dave Dodge	Platform/Tender	20.00	5000	OILWELL 840-E	18,000				Elf Until 9/82
	F G McClintock	Jackup	20.00	10000	OILWELL E-3000	25,000	300	120		AGIP Until 5/83
EGYPT										
Dixilyn-Field Drlg	82	Jackup	13.63	5000	National 1320-UE	20,000	250		GS-345-1 Gulf of Suez	Drilling
Egyptian Drlg	EDC Rig 22	Platform	13.63	5000	EMSCO WS-1B	17,000			Gulf of Suez	Drilling
	4				National 110	13,000			Gulf of Suez	Drilling
Fluor Drlg Serv	Western Offshore III	Barge	13.63	10000	National 1320-DE	20,000/5"	600	162	Abu Shiban NW-1	Drilling
Foramer	Ile d'Amsterdam	Jackup	13.63	10000	National 1320-DE	20,000	300		Gulf of Suez	IEOC
Intl Chandlers	Sedco 472	Drillship	16.75	10000	OILWELL E-3000	25,000	6000		Maadi	Working
Japan Drlg	Hakuryu I	Jackup	13.63	5000	Niigata N-3000	13,500	110	103	Gulf of Suez	Drilling
Maersk Drlg	Maersk Endurer	Jackup	13.63	10000	OILWELL E-2000	20,000	250	105	Gulf of Suez	Drilling
	Maersk Exerter	Jackup	13.63	5000	OILWELL E-2000	20,000	250	75	Gulf of Suez	Drilling
Ocean Drlg & Expl	Ocean Tide	Jackup	20.00/13.63	2000/10000	National 1320-DE	25,000	250	250	Gulf of Suez GS-19-A-5C	Drilling
	Ocean Typhoon	Drillship	20.00/13.63	2000/5000	National 1320-UE	25,000	600	600	Gulf of Suez/ NN-88-1	Drilling
Offshore Co	Comet	Jackup	13.63	10000	National 1320-UE	20,000	225		Gulf of Suez	Working
	Discover 1/Rig 22	Tender	12.00	3000	National 80-B	12,000	600		Gulf of Suez	Working
	Discoverer II	Drillship	16.75	5000	EMSCO 3000	20,000	1500	124	Gulf of Suez	Working
Santa Fe Drlg	Rig 105	Jackup	21.25	5000	EMSCO C-2	20,000	250	200	Gulf of Suez	Operating
	Santa Fe Mariner I	Semisubmersible	16.75	5000	National 1320-UE	20,000	600	325	Gulf of Suez	Operating
Western Oceanic	Western Triton I	Jackup	13.63	10000	National 1320-UE	20,000/5"	250		Gulf of Suez	Contracted-Deminex
GABON										
Atwood Oceanic	Shiloh	Tender	16.75	5000	National 1320	20,000/5"	600	85	Gabon-Mayumba S A4	Drilling
Cosifor	Navifor Norse	Drillship	16.63/20.00	10000/2000	National 1320-UE	20,000	600			Drilling
Dyvi Drlg A/S	J/U Dyvi Gamma Trigone 2	Jackup	21.25	10000	National 1320-UE	25,000		400		Drilling
Foramer	Ile D'Ouessant	Tender	10.00	5000	Ideco H-525	8,000	360		Gulf of Guinea	Elf Gabon
	Ile de la Martinique	Tender	16.75	5000	National 1320-DE	20,000	360		Gulf of Guinea	Elf Gabon
	Ile De l'Europe	Tender	10.00	5000	National 110-DE	16,000	250		Gulf of Guinea	Elf Gabon
	Shiloh	Tender	16.75	5000	National 1320-DE	20,000	450		Gulf of Guinea	Elf Gabon
Forex-Neptune	Searex I	Tender	16.75	5000	Gar-Den 1100-E	18,000		200		Drilling
	Searex 2	Tender	11.00	10000	Gar-Den 500-E	11,000		350		Operating
Global Marine Drlg	Glomar Adriatic I	Jackup	13.63	10000	National 1625-DE	25,000	300	300		Elf
	Glomar Adriatic II	Jackup	13.63	10000	National 1625-DE	25,000	300	300		Elf
	Glomar Main Pass I	Jackup	13.63	10000	National 1625-DE	25,000	300	300		Shell
Ocean Drlg & Expl	Ocean Ruler	Jackup	20.00/13.63	2000/5000	National 1625-EU	25,000	250	250	NBNM No 3	Drilling
Reading & Bates Drlg	J W Bates	Drillship	20.00	10000	National 1320-UE	20,000	600			Contracted-Elf
Santa Fe Drlg	Mariner 2	Semisubmersible	16.75	5000	National 1320-UE	20,000	600	300	Gabon	Operating
IVORY COAST										
Fluor Drlg Serv	Western Offshore V	Barge	16.75	5000	National 1320-DE	20,000/5"	600	170	N Tano 1-X	P&A Prep to Tow-Malta
Foramer (Offshore Europe)	Petrel		16.75	10000	National 1625-DE	25,000	2000			Philipps
Forex-Neptune	Unifor 2	Platform	13.63	5000	EMSCO 1500-E	21,700				Drilling
Sedco Overseas Drlg	Sedco 471	Drillship	16.75	10000	OILWELL E-3000	25,000	6000		Abidjaz	Working
Southeastern Drlg Serv	Sedco J	Semisubmersible	21.25/13.63	2000/10000	OILWELL E-3000	25,000/5"	800	360	Blk C1-2X	Drilling
KENYA										
Western Oceanic	Apollo 1	Jackup	13.63	10000	EMSCO C-3	20,000/5"	300			Contracted-Cities Service
LIBYA										
Saipem	Scarabeo 3	Semisubmersible	18.75	10000	National 1625	25,000/5"	1300		CINC 35	Just Arrived
NIGERIA										
Diamond M	Barge 44	Barge-Posted	13.63	5000	OILWELL 3000	25,000	22	18	West Africa	Drilling
Dixilyn-Field Drlg	83	Jackup	13.63	10000	National 1320-UE	20,000	250	225	EBOT-2	Drilling
Foramer	Asteride	Semisubmersible	18.75	10000	Gar-Den 2100-DE	25,000	800			Elf Nigeria
Forex-Neptune	Emsco 1500/2 Belle Isle	Barge	13.63	5000	EMSCO 1500-UE	21,700/5"		22		Drilling
	Ideco 2500/1 Lutece	Barge	13.63	5000	Ideco 2500-E	25,400		22		Drilling
	Neptune 1	Jackup	13.63	5000	National 1625-DE	24,000	257			Drilling
	Trident IV-A	Jackup	13.63	10000	Gar-Den 2100-E	25,400		300		Drilling
Keydril	Key Bermuda	Jackup	13.63	10000	OILWELL 2000	20,000	200			Drilling
	Key Largo	Jackup	13.63	10000	OILWELL E-300	25,000		300		Drilling
Saipem	Saipem Due	Drillship	16.75	5000	National 1625	25,000/5"	1000		A1 X	Spudding in
Santa Fe Drlg	Calabar Queen Rig 83	Tender	20.00	5000	Ideco E-1200	12,000		100	Nigeria	Operating
	Swamp Chief R-86	Barge	13.63	5000	National 110-UE	16,000	22	15	Nigeria	Operating
	Swamp Master R-83	Barge	20.00	5000	Ideco 2500-E	20,000	22	15	Nigeria	Operating
	Swamp Queen R-84	Barge	20.00	5000	National 1320	20,000	22	15	Nigeria	Operating
Sea Drlg Netherlands	Sedneth I	Semisubmersible	16.75	5000	OILWELL 3000	25,000	800	302	Port Harcourt	Drilling
Transworld Drlg Co	46	Submersible	13.63	5000	EMSCO EDA 4-60	20,000	70			Drilling
SOUTH AFRICA										
Sedco Maritime	Sedco K	Semisubmersible	21.25	10000	OILWELL E-3000	25,000/5"	900	355	Mossel Bay	Drilling
	Sedco 708	Semisubmersible	18.75	10000	OILWELL E-3000	25,000/5"	2000	873	Mossel Bay	Drilling
TANZANIA										
Blocker Drlg & Marine	Vermilion Bay	Barge	13.63	10000		30,000				Drilling
TUNISIA										
Ocean Drlg & Expl	Ocean Endeavor	Semisubmersible	18.75	10000	EMSCO C-3 Type 2	25,000	1000	1000	Aster No A-1	Drilling
	Ocean Voyager	Semisubmersible	20.00/13.63	2000/10000	EMSCO C-3 Type 2	25,000	1000	1000	Dougga No 1	Drilling

Contractor	Rig name or no.	Type	BOP Stack		Drwwks make & model	Rated drlg depth with 4½ in. pipe	Water Depth		Location	Status
			Size (ID)	Pressure rating			Rated	Current		
AFRICA (Cont'd)										
TUNISIA (Contd)										
Penrod Drlg	70	Semisubmersible	13.63	10000	National 1625-DE	30,000		600		Drilling
ZAIRE										
Diamond M	9-Diamond M Don E McMahon	Jackup	13.63	10000	OILWELL E-2000	25,000	100		Banana	Drilling
Key Intl Drlg	Key Victoria	Jackup	13.63	5000	OILWELL E-2000	20,000	200	250		Drilling
Von Rautenkranz Hermann	ITAG-102		10.00	3000						Drilling
AUSTRALIA										
AUSTRALIA										
Atwood Oceanics	Regional Endeavour	Drillship	18.75	10000	National 1320	20,000/5"	1500		Brisbane	Drydocking
Loffland Bros	95	Platform	13.63	5000	M-CSCO U-1220	20,000			Snapper A	Working
Pool Australia	Rig 110 Offshore	Platform			Cabot/Franks	9,000			Bass Strait	Standby
South Seas Drlg	Southern Cross	Semisubmersible	18.75	10000	OILWELL E-2000	20,000	1500	100	West Australia	Operating
VICTORIA										
Richter Drlg Pty	12	Platform	13.63	5000	National 110-UE	16,000/5"			Bass Strait	Drilling
CANADA										
UNDESIGNATED										
Global Marine Drlg	Glomar Adriatic III	Jackup	13.63	10000	National 1625-DE	25,000	300			Available
Ocean Drlg & Expl	Ocean Ranger	Semisubmersible	16.75	10000	EMSCO C-3 Type 2	25,000	3000	1500	Hibernia K-18	Drilling
ALBERTA										
Canadian Marine Drlg	Canmar Explorer I	Drillship	18.75	10000	Ideco 2100-E	25,000	600		Beaufort Sea	Drilling
	Canmar Explorer II	Drillship	18.75	10000	Ideco 2100-E	25,000	600	120	Beaufort Sea	Drilling
	Canmar Explorer III	Drillship	18.75	10000	National 1625-DE	25,000	1500	75	Beaufort Sea	Drilling
	Canmar Explorer IV	Drillship	18.75	10000	EMSCO C-3	20,000/5"	607	193	Beaufort Sea	Drilling
Sedco Maritime	Sedco 706	Semisubmersible	18.75	10000	OILWELL E-3000	25,000/5"	1300	308		Drilling
NEWFOUNDLAND										
Zapata Offshore	Zapata Ugland	Semisubmersible	13.63	10000	OILWELL E-3000	25,000	600	519		Drilling-Mobil
NOVA SCOTIA										
Rowan Companies	Rowan Juneaue	Jackup	13.63	10000	National 1625	25,000			Sable Island	
ONTARIO										
Underwater Gas Dev	Mr Neil	Jackup	10.00	3000	Ideco H-525-D	8,000	80	80	Central Lake Erie	
	Telesis	Drillship	8.00	2000	National T-20	5,000	210	210	Central Lake Erie	
	Timesaver II	Jackup	8.00	2000	EMSCO GB-250	5,000	100	100	Central Lake Erie	
EUROPE										
FRANCE										
Global Marine Drlg	Glomar Biscay I	Semisubmersible	18.75	10000	OILWELL E-3000	25,000	600		Stavanger	Elf
GERMANY										
Deutsche Tiefbohr	T-24		13.63	10000	National 80-B UE	13,000				Available
Penrod Drlg	81	Jackup	13.63	10000	National 1320-UE	25,000				Drilling
Von Rautenkranz Hermann	ITAG-103		11.00	10000	Wilson Mogul 42	9,000				Workover
	ITAG-104		12.00	3000	Wilson Mogul 42	6,000				Drilling
	ITAG-108		13.63	5000	Wilson M-75	10,000				Drilling
	ITAG-22		13.63	10000	National 110-M	16,000				Drilling
	ITAG-23		13.63	10000	OILWELL 2000-E	20,000				Drilling
GREECE										
Dan-Tex Intl	Dan Baron	Drillship	18.75	10000	Ideco E-3000	20,000	1000			Drilling
Penrod Drlg	58	Jackup	13.63	10000	National 1625-DE	30,000	210		North Aegean Sea	Drilling
IRELAND										
Southeastern Drlg Serv	Sedco 700	Semisubmersible	21.25	10000	OILWELL E-2000	25,000	1500	1250	Blk 35/8-2	Drilling
ITALY										
Dyvi Offshore	Norkong		13.63		M-CSCO	20,000	250	250	Adriatic	Drilling
Global Marine Drlg	Glomar Grand Banks	Drillship	18.75	10000	National 1625-DE	25,000	600	600	Mila 6/Sicily	Montedison
Ocean Drlg & Expl	Ocean Champion	Jackup	21.25/13.63	2000/10000	National 1625-DE	25,000	250	250	Mediterranean Sea	Repairs
Offshore Co	Discover Seven Seas	Drillship	16.75	10000	EMSCO C-3 Type II	25,000/5"	6000	4500	Mediterranean Sea	Working
Pool-Intairdril	446	Platform	13.63	5000	OIME 1000	10,000			Adriatic Sea	Working-AGIP
	447	Platform			OIME 1000				Adriatic Sea	
Reading & Bates Drlg	Mr Jack	Jackup	20.00	10000	OILWELL E-3000	25,000/5"	300	105		AGIP Until 12/81
Saipem	Black Dog	Jackup	13.58	10000	OILWELL E-2000	21,000	300			Under Tow
	Perro Negro	Jackup	13.63	10000	Ideco P E-2500	21,000	130		Tiziana 1	Drilling
	Scarabeo 2	Semisubmersible	18.75	10000	Ideco P E-2500	21,000/5"	600		Katia 1	Drilling
	Scarabeo 4	Semisubmersible	18.75	10000	National 1625	25,000	1300		Plinio Sud 1	Working
	5853	Platform	13.63	5000	PCB 14				Working Over	
	5890	Platform	13.58	10000	Ideco E-2100	25,000			Adriatic	Idle
MEDITERRANEAN SEA										
Foramer	Pelican	Drillship	13.63	10000	National 1625-DE	25,000	1100			Totac
SPAIN										
Salvesen Offshore Drlg	Dalkeith				Ideco 3000	25,000		1000	Mediterranean Sea	Drilling
	Dalkeith (Prev Wingate)	Drillship	18.75	10000	Ideco E-3000	20,000	1000	220	Mediterranean Sea	Drilling
Sedco Espana SA	Sedco I	Semisubmersible	16.75	5000	OILWELL E-3000	25,000	1000	309	T'gona	
UNITED KINGDOM										
Santa Fe Drlg	Rig 111/112 Thistle	Platform	21.75	5000	OILWELL 3000-E	20,000		540	Thistle Field	Operating
YUGOSLAVIA										
Pancnorse Drlg	Pacnorse I	Drillship	18.75	10000	EMSCO C-3 Type II	30,000	5000	3000	Yugoslavia	Drydock-Germany

Contractor	Rig name or no.	Type	BOP Stack		Drwwks make & model	Rated drlg depth with 4½ in. pipe	Water Depth		Location	Status
			Size (ID)	Pressure rating			Rated	Current		
MEXICO										
BAY OF CAMPECHE										
Perforadora Mexico S/A	D/B Reforma	Drillship	18.75		National 1625-DE	25,000	600	228		
	D/B Revolucion	Drillship	18.75	10000	National 1625-DE	25,000	600	150		
	Reforma	Drillship	18.75	10000	National 1625-DE	25,000	600	228		
	Revolucion	Drillship	18.75	10000	National 1625-DE	25,000	600	150		
CAMPECHE										
Rowan Companies	Rowan Louisiana	Jackup			National 1625-DE		3000	350	Gulf of Campeche	
	Rowan-Texas	Jackup	13.63	10000	National 1320-UE	25,000/5"	225	225	Gulf of Campeche	Drilling
MIDDLE EAST										
ABU DHABI										
Foramer	Ile de France	Jackup	13.63	5000	National 1625-DE	25,000	200		Arabian Gulf	Adma
	Ile du Levant	Jackup	13.63	5000	National 1320-DE	20,000	150		Arabian Gulf	
Foramer (Interdrill)	Tourmaline	Jackup	10.00	5000	National 80-B	12,000	100		Arabian Gulf	Zadco
Forex-Neptune	Trident 5	Jackup	10.00	5000	Ideco E-900	12,000	150	150		Operating
	Trident-III	Jackup	13.63	5000	Gar-Den 2100-E	25,400		300		Drilling
Japan Drlg	Hakury U-VI	Jackup	13.63	5000	National 1320-UE	20,000	180	53	UAE	Drilling
National Drlg	Al Ghallan	Jackup	13.63	5000	National 1320-UE	2,000	150	125	Zakum Field	Drilling
	Al Ittihad	Jackup	13.63	5000	National 1320-UE	20,000	150	125	Hair Dalme	Drilling
	Al Yasat	Jackup	13.63	5000	National 1320-UE	20,000	150	125	Zakum Field	Drilling
	Diyina	Jackup	13.63	5000	National 1320-UE	20,000	150	125	Zakum Field	Drilling
	Junana	Jackup	13.63	10000	National 1320-UE	20,000	150	125	Zakum	Drilling
Penrod Drlg	56	Jackup	13.63	10000	National 1625-DE	30,000	150	150		Drilling
	57	Jackup	13.63	10000	National 1625-DE	30,000	150	150		Drilling
Sedco Dubai	Sedco 160	Jackup	13.63	5000	EMSCO C-2	25,000	160	100	ADOC Conces'n	Spud Date 6/7/81
	Sedneth 201	Jackup	13.63	10000	EMSCO C-2	25,000	200	100	ADMA Conces'n	Under Construction
	Sedneth 202	Jackup	13.63	10000	EMSCO C-2	25,000	200	100	ADMA Conces'n	Under Construction
Western Oceanic	Apollo III	Jackup	13.63	10000	EMSCO C-3 II	20,000/5"	100			Under Construction
	Apollo IV	Jackup	13.63	10000	EMSCO C-350	20,000/5"	100			Under Construction
ARABIAN GULF										
Transocean Drlg	Transocean No 5	Jackup	13.63	10000	EMSCO C-3 Type II	25,000	300			Working
DUBAI										
Atwood Oceanics	Bull Run	Tender	13.63	5000	OILWELL E-2000	20,000/5"	400	377	Arabian G-Dubai Fateh Q-4	Drilling
IRAN										
Reading & Bates Drlg	M G Hulme	Jackup	20.00	10000	National 1320-UE	25,000	250			
Seacrest Drlg	Seacrest Bay	Jackup	13.63	10000	OILWELL E-3000	25,000/5"	250	250	Pars Field	Drilling
PERSIAN GULF										
Zapata Offshore	Chaparral	Jackup	13.63	10000	OILWELL 3000-E	25,000	240	53		Drilling-Zadco
	Heron	Jackup	13.63	10000	National 1625-DE	25,000	300	41		Drilling-Zadco
QATAR										
Forex-Neptune	Trident II	Jackup	20.00	10000	Gar-Den 2100-RE	25,400		300		Drilling
Santa Fe Drlg	Rig 103	Jackup	20.00	5000	EMSCO C-2	20,000	250	200	Qatar	Operating
SAUDI ARABIA										
Arabian Drlg	Arabdrill 2	Tender			National 110	19,000		200	Arabian Gulf	Drilling
Loffland Bros	Oceanmaster III-R-150	Jackup	13.66	3000	M-CSCO U-712-A	14,000	160		Manifa Field	Working
	Orville Fisher/Rig 183	Platform	13.63	5000	M-CSCO U-914-C	18,000				Dry Dock
Offshore Co	Bahram	Jackup	13.63	5000	Ideco ED-1200	13,000	200	50		Working
	Jubilee	Jackup	13.63	5000	EMSCO A-1500-E	20,000	246	135		Working
	North Star	Jackup	13.63	5000	National 1320-DE	20,000	250	43		Working
Pool Arabia	142-Offshore	Jackup	13.63	5000	National 80-B	12,000	150		Arabian Gulf	Working
	143	Jackup	10.00	5000	OIME 1000	12,500	160	120	Arabian Gulf	Working
	144	Jackup	13.63	5000	OIME 1000-E	10,000	160		Arabian Gulf	Working
	145	Jackup	13.63	5000	OIME 1000-E	10,000	160		Arabian Gulf	
Reading & Bates Drlg	Ron Tappmeyer	Jackup	20.00	10000	OILWELL E-3000	20,000	300			ARAMCO Until 5/83
Rowan Companies	Rowan-Alaska	Jackup			National 1625-DE	30,000	350		Ras Tanaur	
Rowan Intl	Rowan-New Orleans	Jackup	13.63		National 1324-UE	25,000/5"	225	225	Ras Tanaur	
SHARJAH										
Dolphin Intl	60	Tender/Jackup	13.63	10000	National 1320-UE	20,000	225		Yard	
UAA										
Transocean Drlg	63	Jackup	13.63	5000	EMSCO C-3 Type II	25,000	250			Drilling
UAE										
Interocean Drlg SA	Interocean III	Jackup	13.63	10000	National 1325-UE	20,000	300	48		Drilling
Offshore Co	Antares	Jackup	10.00	5000	National 130	12,000	115	80		Working
	Hustler	Jackup	12.00	5000	EMSCO A-550	10,000	90	62		Working
	Jupiter	Jackup	13.63	10000	National 1320-UE	20,000				Enroute
	Rig 54	Jackup	13.63	5000	National 130-E	20,000	150	73		Working
Sedco Dubai	Sedneth II	Jackup	20.00	5000	OILWELL 3000-E	25,000	200	180	Abu Dhabi	Drilling
	75	Jackup	20.00	5000	OILWELL 96	20,000	100		Abu Dhabi	Drilling
YEMEN										
J L Offshore	Dan Queen	Semisubmersible	18.75	10000	National 1320-UE	20,000		1000		Drilling
NORTH SEA										
UNDESIGNATED										
Odfjell Drlg & Consulting	Deep Sea 722 Leviathan	Jackup			National 37½	25,000		300		
	Deepsea Saga H-3				National 49½	25,000		1500		
	Gulnare Pentagone				National 49½	25,000		1000		
Wilh Wilhelmsen	Treasure Finder SS H-3				EMSCO C-3 Type 2	25,000		1000		
	Treasure Hunter				EMSCO C-3 Type 2	25,000				
	Treasure Seeker SS H-3				EMSCO C-3 Type 2	25,000		1250		
DENMARK										
Dyvi Drlg A/S	J/U Dyvi Beta (Trigone 1)	Jackup	21.25	2000	National 1320-UE	25,000	400	350	Dan Field	Drilling
Maersk Drlg	Maersk Explorer	Jackup	13.63	10000	National 1320-UE	25,000	205	120	Gom Field	Development Drlg

NORTH SEA (Cont'd)

Contractor	Rig name or no.	Type	BOP Stack		Drwwks make & model	Rated drlg depth with 4½ in. pipe	Water Depth		Location	Status
			Size (ID)	Pressure rating			Rated	Current		
FINLAND										
Global Marine Drlg	Glomar Arctic I	Semisubmersible	18.75	15000	OILWELL E-3000	25,000	1500			Available
IRELAND										
Smedvig Drlg	West Venture (Norrig V)		18.75	10000	EMSCO 3-C	30,000/5"	1200	1100	63/10	Drilling
NETHERLANDS										
Penrod Drlg	64	Jackup	13.63	10000	National 1625-DE	30,000	210			Drilling
	67	Jackup	13.63	10000	National 1625-DE	30,000	210		North Sea	Drilling
Santa Fe Drlg	Britannia R-65	Jackup	20.00	10000	National 1320-DE	20,000	160	140	Netherlands	Operating
Transocean Drlg	Transocean No 1	Jackup	11.00	10000	EMSCO A-1500-E	20,000				Drilling
	Transocean No 2	Jackup	13.63	10000	National 1625-DE	20,000	150			
	Transocean No 4	Jackup	13.63	10000	National 1320-UE	25,000	160			
NORWAY										
Dyvi Drlg A/S	D/R Dyvi Alpha	Jackup	18.75	10000	National 1625-DE	25,000	1000	800	Frigg Field	Drilling
Dyvi Offshore A/S	CJ-46-1	Jackup	13.63	10000	National 1320-UE	25,000	250	250	Norway	
	CJ-46-2	Jackup	13.63	10000	National 1320-UE	25,000	250	250	Norway	
	Dyvi Delta		18.75	10000	OILWELL	25,000	3000	1500	Norway	
Fearnley Offshore	Fernstar		18.75	10000	EMSCO Type II	25,000	1000		North Sea	Drilling
	Fernstate		18.75	10000	EMSCO C-3 Type II	25,000	1000		North Sea	Drilling
Global Marine Drlg	Glomar Biscay II	Semisubmersible	18.75	10000	National 1625-DE	25,000	600	600		Esso
Golar-Nor Offshore A/S	Nortroll (Aker H-3)	Semisubmersible	18.75	10000	National 1625-DE	25,000	1000	1000		
Intl Chandlers	Nautilus 3	Platform	13.63	10000	National 1320-UE	20,000	260	260	Albuskjell Z/4F	Drilling
	Nautilus 4	Platform	13.63	10000	National 1320-UE	20,000	260	260	Albuskjell 1.6A	Logging
	Sedco PSSI	Semisubmersible							Eldfisk 2/7B	Surveying
Loffland Bros	44	Platform	13.63	5000	M-CSCO U-1220-EB	20,000			Phillips Eldfisk	Working
	51	Platform	13.63	5000	M-CSCO U-1220-EB	20,000		467	Statfjord A	Working
Ross Drlg	Koldnes No 219	Bingo 3000	18.75	10000	OILWELL E-3000	25,000	1500			Under Construction
	Neptuno Nordroug	Aker H-3	18.75	10000	National 1625-DE	25,000	1500	394	15-9-7	
	Ross Rig	Aker H-3	18.75	10000	National 1625-DE	25,000	1250	597	7119/12-2	Drilling
Smedvig Drlg	TBN-Bingo-300 West Vanguard	Semisubmersible	18.75	10000	EMSCO 3000	25,000/5"	1500			Under Construction-Del 10/82
Southeastern Drlg Serv	Sedco 703	Semisubmersible	18.75	10000	OILWELL 3000	25,000	2000	1250	Blk 34/2-2	Logging
	Sedco 707	Semisubmersible	21.25/13.63	2000/10000	OILWELL E-3000	25,000	2000	234	Blk 7/12	Drilling
Stavanger Drlg A/S	Henrik Ibsen	Semisubmersible	18.75	10000	Gar-Den 3000-E	30,000	1200	1200	Ekofisk	
	89 Pentagone	Semisubmersible	18.75	10000	Gar-Den 3000-E	30,000	1200	1200	Ekofisk	
SCOTLAND										
Loffland Bros	43	Platform	13.63	10000	Ideco E-3000	20,000			Shell Brent C	Working
	81	Platform	13.63	5000	M-CSCO U-1220-EB	20,000		450	Chevron Ninian Central	Working
	82	Platform	13.63	5000	M-CSCO U-1220-EB	20,000		450	Ninian Central	Working
	83	Platform	13.63	5000	M-CSCO U-1220-EB	20,000			Ninian South	Working
	84	Platform	13.63	5000	M-CSCO U-1220-EB	20,000			Ninian South	Working
Marine Drlg SA	Sedco 709	Semisubmersible	16.75	10000	OILWELL E-3000	25,000	6000	1700	North Sea	Working
Transworld Drlg Co	58	Semisubmersible	13.63	5000	EMSCO C-3000	20,000	600			Drilling
Zapata Offshore	Zapata Nordic	Jackup	13.63	10000	EMSCO C-3 Type II	20,000	300	154		Drilling-BENOC
SPAIN										
Dolphin Intl	15	Platform	13.63	10000	EMSCO C-2	25,000			Casablanca Field	En Route
UNITED KINGDOM										
Atlantic Drlg	Bendoran Aker H-3	Semisubmersible	21.25	2000	National 1625-DE	20,000/5"	850	559	Blk 13/30-1	Drilling
	Benurackie	Semisubmersible	21.25	2000	National 1625-DE	20,000/5"	850	455	Blk 20/2-1	Drilling
Bawden Drlg	34	Platform	13.63	5000	National 1320-UE	22,000			North Sea	Drilling
	35	Platform	16.63	5000	National 1320-UE	20,000			North Sea	Drilling
	36	Platform	13.63	5000	National 1320-UE	22,000			North Sea	Drilling
	37	Platform	12.00	3000	Wilson 75-E	8,500			North Sea	Drilling
	39	Platform	20.00	5000	National 1320-UE	22,000			North Sea	Drilling
	40	Platform	13.63	5000	National 1363-UE	20,000			North Sea	Drilling
	41	Platform	13.63	5000	National 1320-UE	20,000			North Sea	Drilling
	42	Platform	13.63	5000	National 1320-UE	22,000/5"			North Sea	Drilling
BP Petroleum Dev	Forties Alpha	Platform	20.00	2000	National 110-UE	16,000	400		Forties Field	Operational
	Forties Bravo	Platform	20.00	2000	National 110-UE	16,000	400		Forties Field	Operational
	Forties Charlie	Platform	20.00	3000	National 110-UE	16,000	400		Forties Field	Operational
	Forties Delta	Platform	20.00	2000	National 110-UE	16,000	400		Forties Field	Operating
	Sea Conquest Aker H-3	Semisubmersible	20.00	10000	National 1625	25,000	1200		211/12	Operational
Deutsche Tiefbohr	T-20	Platform	13.63	10000	National 1320-UE	18,000		140	Blk 211/20	Drilling
	T-21	Platform	13.63	10000	National 1320-UE	18,000		140	Blk 211/29	Drilling
	T-25	Platform	13.63	10000	National 1320-UE	18,000		140	Blk 211/23	Drilling
Dixilyn-Field Drlg	96	Semisubmersible	18.75	10000	National 1625	25,000	1200	1200	Blk 211-27	Drilling
	97	Semisubmersible	18.75	10000	EMSCO C-111-2	25,000	1200		Blk 2-5-14	Drilling
Forex-Neptune	Pentagone 84	Semisubmersible	13.63	10000	Gar-Den 3000-E	24,000/5"		660	UK Sector	Drilling
Kingsworth Marine Drlg	Dundee Kingsworth Aker H-3	Semisubmersible	18.75	10000	National 1625-DE	24,000		1000	Continental Shelf	Drilling BP/June Conoco
	Kingsworth UK Aker H-3	Semisubmersible	18.75	10000	National 1625-DE	24,000		1250	Continental Shelf	Drilling BP
KCA Drlg	51	Platform			National 1320-UE	20,000			North Sea	Drilling
	52	Platform	21.25	5000	National 1320-UE	20,000			North Sea	Drilling
Ocean Drlg & Expl	Ocean Bounty	Semisubmersible	16.75	10000	EMSCO C-3 Type II	25,000	1200	1200	Blk 21/38-3	Drilling
	Ocean Kokuei	Semisubmersible	20.00/13.63	2000/10000	EMSCO C-3 Type 2	25,000	600	600	15/16-11	Drilling
Offshore Co	Chris Chenery	Semisubmersible	13.63	10000	National 1625-DE	20,000/5"	600	400	North Sea	Working
	534	Drillship	16.75	10000	National 1625-DE	25,000	3000		North Sea	Working
Penrod Drlg	80	Jackup	13.63	10000	National UE	30,000				Drilling
Rowan Intl	Charles Rowan	Jackup	13.63	10000	National 1625	25,000	300	5	Blk 49/26	Drilling
Santa Fe Drlg	82	Platform	20.00	5000	National 1320-UE	20,000			United Kingdom	Operating
Sea Drlg Netherlands	Sedneth 701	Semisubmersible	21.25	10000	OILWELL E-3000	25,000	1500	260	Blk 16/29-A7	Drilling
Southeastern Drlg Serv	Sedco H	Semisubmersible	21.25/13.63	2000/10000	OILWELL 3000	25,000	800	250	Blk 13/27/1	Drilling
	Sedco 704	Semisubmersible	18.75	10000	OILWELL 3000	25,000	1500	280	Blk 16/26-3	Drilling
Western Oceanic	Apollo II	Jackup	13.58	10000	EMSCO C-3	20,000/5"	300		North Sea	Under Construction

NORTH SEA (Cont'd)

Contractor	Rig name or no.	Type	BOP Stack		Drwwks make & model	Rated drlg depth with $4\frac{1}{2}$ in. pipe	Water Depth		Location	Status
			Size (ID)	Pressure rating			Rated	Current		
UNITED KINGDOM (Contd)										
Western Oceanic	Western Pacesetter I	Semisubmersible	18.75		National 1625-DE	25,000	600		North Sea	Contracted-Phillips
	Western Pacesetter III	Semisubmersible	18.75	10000	EMSCO C-3 II	25,000	1200		North Sea	Contracted-Shell
	Western Pacesetter II	Semisubmersible	18.75	10000	National 1625-DE	25,000	1200		North Sea	Contracted-Chevron

SOUTH AMERICA

Contractor	Rig name or no.	Type	BOP Stack		Drwwks make & model	Rated drlg depth with $4\frac{1}{2}$ in. pipe	Water Depth		Location	Status
			Size (ID)	Pressure rating			Rated	Current		
ARGENTINA										
Diamond M	Epoch	Semisubmersible	16.75	10000	OILWELL E-3000	30,000	1200	1000		Under Tow
Interocean Drlg SA	Interocean II	Jackup	13.63	10000	EMSCO C-2	20,000	300	175		Drilling
Rio Colorado SA	Rio Colorado 1	Jackup	13.63	5000	National P-160	20,000	300	100	TDF 1	Drilling
BRAZIL										
Amoshore Drlg	Discoverer 511	Drillship	18.75	10000	Ideco E-2100	20,000	2000	190		Working
Dolphin Intl	Bayoy Bolphin III	Tender/Jackup	13.63	10000	EMSCO A-1500	20,000	230		Ubarana	Drilling
	95	Tender/Platform	13.63	5000	M-CSCO U-1220-EB	25,000	300		Xareu Field	Drilling
Forex-Neptune	Neptune Gascogne	Jackup	13.63	10000	National 1625-UE	25,000	290	290		Drilling
Key Intl Drlg	Key Biscayne	Jackup	16.63	1363	National 1320-UE	20,000	250	250		Drilling
	Key Gibraltar	Jackup	13.63	10000	OILWELL E-2000	25,000	300	280		Drilling
	Key West	Jackup	13.63	10000	EMSCO C-3	25,000	350	350		Drilling
Maersk Drlg	Maersk Pioneer SS	Semisubmersible	18.75	10000	EMSCO C-2 Type II	20,000	600	180	Compos Field	Drilling
Maersk Drlg/Odeco	Zephyr II	Semisubmersible	21.50	10000	National 1625-DE	25,000	600	420	Compos Area 1-RJS-92	Drilling
Marlin Drlg	Marlin No 7	Semisubmersible	13.63	10000	National 1625-DE	30,000	1000	114		
Ocean Drlg & Expl	Ben Ocean Lancer	Drillship	16.75	10000	Gar-Den 3000	25,000	3000	3000	1-SCS-9A	Drilling
	Ocean Cyclone Ship	Drillship	16.75	5000	National 1625	25,000	600	600	1-RJS-137	Drilling
	Zephyr I	Semisubmersible	21.25	10000	EMSCO 3-C T-2	25,000	600	600	1-RJS-171	Drilling
	Zephyr II	Semisubmersible	21.25	10000	EMSCO C-3 TS	25,000	600	600	1-RJS-170	Drilling
Odeco/Maersk Drlg	Zephyr I	Semisubmersible	21.50	10000	EMSCO C-3 Type II	25,000	600	400		Drilling
Offshore Co	Orion	Jackup	13.63	10000	National 1320-DE	20,000	275	229	Amapa	Working
Penrod Drlg	59	Jackup	13.63	10000	National 1625-DE	30,000	220	95		Repairs
	62	Jackup	13.63	10000	National 1625-DE	30,000	330	308		Drilling
	71	Semisubmersible	13.63	10000	National 1625	30,000	1000	970		Drilling
	72	Semisubmersible	13.63	10000	National 1625-DE	30,000	300			Drilling
	75	Semisubmersible	13.63	10000	National 1625-DE	30,000	2000	677		Drilling
Reading & Bates Drlg	C E Thornton	Jackup	20.00	10000	DWS E-3000	25,000	300			Petrobras Until 7/82
Rowan Companies	Rowan Midletown	Jackup			National 1625				Salvador	
Salen Protexa Drlg	Salenergy VI	Jackup	13.63	10000	M-CSCO U-1220-BE	25,000	250			Under Construction
Sedco	Sedco 135-F	Semisubmersible	13.63/21.25	10000/2000	OILWELL 3000-E	25,000/5"	800	430	Campos Basin	Drilling
Sedco Intl SA	Sedco 135-D	Semisubmersible	16.75	5000	OILWELL 3000-E	25,000/5"	800	377	Campos Basin	Drilling
Sedco Maritime	Sedco 702	Semisubmersible	21.25	10000	OILWELL E-3000	25,000/5"	1200	346	Amazon Delta	Drilling
Transworld Drlg Co	61	Semisubmersible	13.63	10000	EMSCO A-1500-E	20,000	600			Drilling
Tropic Drlg & Expl	DS Tainaron	Drillship	18.75	10000	National 1320-DE	30,000	1000	500	Campos	Drilling
CHILE										
Diamond M	Diamond M General	Semisubmersible	18.75	10000	OILWELL E-3000	30,000	1500	1000	West Coast	Drilling
	Magallanes	Jackup	13.63	5000	OILWELL E-3000	25,000	150		Strait of Magellan	Drilling
	Nugget	Jackup	13.63	5000	OILWELL E-3000	30,000	300	150	Strait of Magellan	Drilling
COLOMBIA										
Rowan Intl	Rowan-Houston				National 1325-UE	25,000		225		
VENEZUELA										
Loffland Bros	R-71-WO	Barge			Ideco H-25				Lake Maracaibo	Workovers
	V-101	Barge	6.00	5000	Ideco 7-11	10,000			Lake Maracaibo	Workovers
	V-105	Barge	10.00	5000	M-CSCO U-914-B	18,000			Lake Maracaibo	Working
	V-114	Barge	10.00	5000	M-CSCO U-914-C	18,000			Lake Maracaibo	Working
	V-116	Barge	10.00	5000	National 130	20,000			Lake Maracaibo	Working
Ocean Drlg & Expl	Ocean Rover	Semisubmersible	20.00/13.63	2000/10000	EMSCO C-3 Type 2	25,000	600	600	PMO-2X	Drilling
Offshore Co	Estrellita T-27	Tender/Jackup	13.63	5000	National 1320-UE	18,000	150	95	Lake Maracaibo	Working
	Polarcub	Tender/Jackup	12.00	5000	National 110	16,000	100	95	Lake Maracaibo	Working
	Rig 60/OV-1	Tender/Jackup	10.00	5000	EMSCO A-1100-E	16,000	100	100	Lake Maracaibo	Working
Perforaciones Alta Mar CA	Rig I	Tender			National 1625	20,000				
	Rig III	Tender			National 130	20,000				
Rowan Companies	Rowan Odessa	Jackup	13.63	10000	National 1625				Gulf of Paria	
Santa Fe Drlg	Orinoco I (R132)	Barge	21.25	10000	OILWELL E-2000	20,000	20		Orinoco	Under Construction-Del 6/81
	Reina Del Lago	Barge	12.00	3000	National 80-E	14,000	100	100	Lake Maracaibo	Operating
	Rey Del Lago	Barge	12.00	3000	National 80-E	14,000	100	100	Lake Maracaibo	Operating

SOUTHEAST ASIA

Contractor	Rig name or no.	Type	BOP Stack		Drwwks make & model	Rated drlg depth with $4\frac{1}{2}$ in. pipe	Water Depth		Location	Status
			Size (ID)	Pressure rating			Rated	Current		
UNDESIGNATED										
Reading & Bates Drlg	Roger W Mowell	Jackup	13.63	10000	National 1625-DE	25,000	300			Committed
Santa Fe Drlg	141	Jackup	13.63	10000	OILWELL E-2000	20,000				Under Construction
BRUNEI										
Reading & Bates Drlg	Chris Seeger	Jackup	29.50	10000	Ideco 2500	20,000	210			Brunei Shell Petroleum
	I J Pierce	Platform/Tender	20.00	5000	OILWELL 840-E	18,000				Brunei Shell Petroleum
	J W Nickle	Platform/Tender	20.00	5000	OILWELL 840-E	18,000				Brunei Shell Petroleum
EAST MALAYSIA										
Atwood Oceanics	Margie	Semisubmersible	18.75	10000	National 1320	20,000/5"	600	274	Sarawak B-16-1	Drilling
Forex-Neptune	Grand Large	Tender	13.63	5000	Gar-Den 1500-UE	21,700	250	250	Sarawak	Drilling
	Trident 1	Jackup	13.63	10000	Gar-Den 1500-UE	21,700		250		Drilling
Maersk Drlg	Aquadril 1 SCP	Platform	13.63	5000	EMSCO C-2 Type II	15,000				Drilling
Southeastern Ocean Drlg	Sedco 135-A	Semisubmersible			OILWELL 3000	25,000	600		Sarawak	Workiing
INDIA										
Atlantic Drlg	Benlomond	Drillship	18.75	10000	EMSCO C-2 Type		1000	302	Andaman Islands ANI-2	Drilling
Atwood Oceanics	Fredericksburg	Drillship	18.75	10000	EMSCO C-2 Type III	20,000/5"	750	446		
	Gettysburg	Barge	18.75	10000	National 1320	20,000/5"	600	167	Andaman Island	Drilling
	Shenandoah	Jackup	20.00	10000	EMSCO C-2	20,000/5"	300	246	India-Arabian Sea-Plat NP	Drilling

Petroleum Engineer® INTERNATIONAL

Contractor	Rig name or no.	Type	BOP Stack		Drwwks make & model	Rated drlg depth with 4½ in. pipe	Water Depth		Location	Status
			Size (ID)	Pressure rating			Rated	Current		
SOUTHEAST ASIA (Cont'd)										
INDIA (Contd)										
Reading & Bates Drlg	W T Adams	Jackup	13.63	2000	National 1525-E	25,000	300		Bombay High	Shell Sarawak 10/83
Salvesen Offshore Drlg	Dalmahoy	Drillship			EMSCO C-3	25,000		700	Bombay High	Drilling
INDONESIA										
Atwood Oceanics	Chancellorsville	Drillship	18.75	10000	EMSCO C-2	20,000/5"	1000	423		Drilling
	Mission Viking	Barge	18.75	10000	National 1625-DE	20,000/5"	600	342	NSB-J4	Drilling
Dolphin Intl SA	Bali/Green Dolphin	Tender/Jackup	13.63	10000	EMSCO A-100-E	16,000	150		Java Sea	Workover
Fluor Drlg Serv	Western Offshore IV	Barge	16.75	5000	National 1320-DE	20,000/5"	600	492	"L" 2-X	Drilling
Forex-Neptune	N-110-12/Gavrinis	Barge	13.68	5000	National 110-UE	21,700	25	25	East Kalimantan	Drilling
	N-110-13/Izenah	Barge	13.63	5000	National 110-UE	21,700	25	25	East Kalimantan	Drilling
Japan Drlg	Hakuryu IV	Jackup	13.63	10000	National 1625-DE	25,000	295	25	East Kalimantan	Drilling
Ocean Drlg & Expl	Ocean Hurricane	Drillship	16.75	10000	National 1625	25,000	600	600	Kapak KH-3X	Drilling
Offshore Co	Discoverer III	Drillship	16.75	5000	National 1625-DE	20,000	600		Gulf of Thailand	Working
Reading & Bates Drlg	D K McIntosh	Jackup	30.00	10000	National 1320	20,000	250			IIAPCO Until 9/81
	Dickson M Saunders	Jackup/Tender	20.00	5000	National 80-B	15,000	160			Contracted IIAPCO
	J W McLean	Jackup	20.00	10000	National 130	20,000	225			ARCO Until 6/81
Rowan Intl	Rowan Anchorage	Jackup	13.63	5000	National 1320-UE	25,000/5"			East Kalimantan	
	Rowan-Morgan City (Fxd Ht)	Barge	13.63	5000	National 1320-UE	25,000	20		East Kalimantan	
Santa Fe Drlg	Santa Fe Explorer	Jackup	20.00	5000	Unit Rig U-914	15,000	160	120	Java	Operating
	124	Jackup	13.63	5000	National 1625-DE	20,000	250		Java	Operating
Western Oceanic	Western Polaris I	Jackup	13.63	10000	National 1320-UE	20,000/5"	250			Contracted-Shell
Zapata Offshore	Topper II	Jackup	13.63	5000	National 110-UE	16,500	115	25		Drilling-Marathon
JAPAN										
J L Offshore	Dan Duke	Jackup	13.63	10000	National 1320-UE	20,000	300			Delivery Oct 81
	Dan Earl	Jackup	13.63	10000	National 1320-UE	20,000	205			Delivery Feb 82
	Dan King	Jackup	13.63	10000	National 1320-UE	20,000	205			Delivery Jul 81
Japan Drlg	Hakuryu III	Semisubmersible	18.75	10000	EMSCO C-31-11	30,000	1000	266	East China Sea	Drilling
	Hakuryu V	Semisubmersible	18.75	10000	EMSCO C-3 II	30,000	1640	246	Sea of Japan	Drilling
	Hakuryu VII	Jackup	13.63	10000	National 1320-UE	20,000	150		Sea of Japan	Drilling
Offshore Co	John Shaw	Semisubmersible	18.75	10000	EMSCO C-3 Type II	30,000	1500			Under Construction
KOREA										
Santa Fe Drlg	135	Semisubmersible	18.75	10000	OILWELL E-3000	25,000	1500			Under Construction
	140	Semisubmersible	18.75	10000	OILWELL E-3000	25,000	1500			Under Construction
MALAYSIA										
Fluor Drlg Serv	Western Offshore VII	Barge	16.75	5000	Gar-Den 2100-RE	25,000/5"	600	207	Bedong 2	Drilling
J L Offshore	Danwood Ice	Drillship	18.75	10000	National 1320-UE	20,000		1000	Sarawak	Drilling
Loffland Bros	46	Platform	13.63	5000	M-CSCO U-914-CE	18,000			Tapis C	Drilling
	47	Platform	13.63	5000	M-CSCO U-914	18,000				Stacked
Ocean Drlg & Expl	Ocean Digger	Semisubmersible	18.75	10000	EMSCO A-1500	25,000	600	600	Duyong 6H-32.3	Drilling
Reading & Bates Drlg	D R Stewart	Jackup	13.63	10000	OILWELL E-3000	25,000	300		Miri	Shell Sarawak 10/83
Sedco	Sedco 135-E				OILWELL 3000	25,000		600	Kuala Belait	Working
NEW ZEALAND										
Intl Chandlers	Sedco 445	Drillship	16.75	10000	OILWELL E-3000	25,000	3000		New Plymouth	Working
PHILIPPINES										
Dixilyn-Field Drlg	95	Semisubmersible	18.75	10000	National 1625-DE	25,000	600		Cadlao	Drilling
Forex-Neptune	Trident 6	Jackup	13.63	10000	Gar-Den 1500-E	21,700	300	200		Drilling
Ocean Drlg & Expl	Ocean Prospector	Semisubmersible	18.75	10000	EMSCO C-3 Type 2	25,000	1000	1000	Pandom No 1	Drilling
Penrod Drlg	74	Semisubmersible	13.63	10000	National 1625-DE	30,000	1700			Drilling
SARAWAK										
Reading & Bates Drlg	Charlie Graves	Platform/Tender	20.00	10000	National 1320-UE	25,000/5"				Shell Sarawak Until 7/83
SINGAPORE										
Forex-Neptune	45 Helirig	Barge	13.63	5000	Wilson EH-120	16,900		25		Reconversion
Houston Offshore Intl	Sabine IV	Jackup	13.63	10000	National 1320-UE	20,000	200			Under Construction
Keydril	Kep Singapore	Jackup	13.63	10000	National 1625	25,000	300			Under Construction
Reading & Bates Drlg	Harvey H Ward	Jackup	13.63	10000	National 1625	25,000	300			Committed
Zapata Offshore	Investigator	Drillship	13.63	5000	Ideco H-2500	16,500	450	129		Drilling-Pitco
	31	Jackup	13.63	15000	National 1625-DE	25,000	200			Under Construction
	32	Jackup	13.63	10000	National 1320	20,000	250			Under Construction
	33	Jackup	13.63	10000	National 1320	20,000	250			Under Construction
SOUTH KOREA										
Reading & Bates Drlg	Jim Cunningham	Semisubmersible	18.75	10000	National 1625-DE	25,000	1500			Committed
	M G Hulme Jr	Semisubmersible	18.75	10000	National 1625	25,000	1500			Available
TAIWAN										
Fluor Drlg Serv	Western Offshore IX	Drillship	18.75	10000	National 1625-DE	25,000/5"	750	380		Drilling
	Western Offshore VIII	Drillship	16.75	5000	National 1625-DE	25,000/5"	600	157	CBS-1	Drilling
Santa Fe Drlg	127	Jackup	13.63	5000	National 1320-UE	20,000	250			Under Construction-Del 6/81
	134	Jackup	21.25	10000	National 1320-UE	20,000	250			Under Construction-Del 12/81
	136	Jackup	13.63	10000	National 1320-UE	20,000	250			Under Construction
THAILAND										
Global Marine Drlg	Glomar Conception	Drillship	18.75	10000	National 1625-DE	25,000	1000	600	Gulf of Thailand	Union Oil
	Glomar Tender III	Tender	13.63	5000	National 1625-DE	25,000		600	Gulf of Thailand	Union Oil
Reading & Bates Drlg	E W Thornton	Drillship	20.00	5000	OILWELL E-3000	25,500	600			Contracted Texas Pacific
	W D Kent	Platform-Tender	21.25	5000	National 1320-UE	25,000/5"				Union Oil Until 6/82
Seacrest Drlg	Seacrest	Drillship	18.75	10000	OILWELL E-3000	25,000/5"	1000	1000	Gulf of Thailand	Drilling
USSR										
Japan Drlg	Hakuryu II	Semisubmersible	20.75	5000	EMSCO C-3 11	30,000	656	98	Sakalin Island	Drilling
UNITED STATES										
ALABAMA - UNDESIGNATED										
Ocean Drlg & Expl	Mr Charlie	Submersible	13.63	10000	EMSCO EDES	25,000	40	40		Option to OPCO

UNITED STATES (Cont'd)

Contractor	Rig name or no.	Type	BOP Stack		Drwwks make & model	Rated drlg depth with 4½ in. pipe	Water Depth		Location	Status
			Size (ID)	Pressure rating			Rated	Current		
ALABAMA - MOBILE										
Diamond M	Diamond M Eagle	Semisubmersible	18.75	10000	OILWELL E-3000	30,000	2000			Under Construction
	Diamond M Hunter	Semisubmersible	18.75	10000	OILWELL E-3000	30,000	1500			Under Construction
Penrod Drlg	65 Mobil	Jackup	13.63	10000	EMSCO C-3	30,000	210	128	Mobile Bay	Drilling
Rowan Intl	Barge 4	Barge	13.63	10000	National 1625-DE	30,000	22	14	Mobile Bay	
ALABAMA - MOBILE BAY										
Atlantic Pacific Marine	7	Barge	13.63	5000	OILWELL 2000	25,000	20			Drilling
CALIFORNIA - UNDESIGNATED										
Global Marine Drlg	Glomar Atlantic	Drillship	18.75	10000	National 1625-DE	25,000	3000	2000		Chevron
	Glomar Coral Sea	Drillship	18.75	10000	National 1625-DE	25,000	1500	1500		Chevron
	Glomar Grand Isle	Drillship	18.75	10000	National 1625-DE	25,000	600	600		Chevron
	Glomar Pacific	Drillship	16.75	10000	National 1625-DE	25,000	3000	2000		Exxon
	Glomar Platform I	Platform	13.63	5000	National 110-UE	16,000				Chevron
	Glomar Platform II	Platform	13.63	5000	National 110-UE	16,000				Chevron
Pool Offshore	Rig #10	Platform	13.63	5000	OIME 750	8,000		180	Platform Holly	Working
	Rig #4	Platform	10.00	5000	National T-45	6,000				Working
	Rig #421	Platform	13.63	5000	OIME 750	12,000		200	Platform Henry	Working
	Rig #422	Platform	13.63	5000	OIME 750	12,000		160	Platform Hope	Working
	420	Platform	13.63	5000	OIME 750	10,000		200		Working-Getty
	426	Platform	13.63	5000	OIME 750	10,000		130	Platform Emmy	Working
	427	Platform			OIME 1500	16,000				Working-Chevron
FLORIDA - CHARLOTTE HARBOR										
Offshore Co	Offshore Mercury	Jackup	13.63	10000	National 1320-DE	20,000/5"	250	115		Working
FLORIDA - ELBOW										
Rowan Co	Rowan Midland	Semisubmersible	13.63		National 1625	25,000				Blk 915
FLORIDA - PENSACOLA										
Fluor Drlg Serv	Mr Mel #59	Jackup	13.63	10000	National C-1625-DE	30,000	350	96	GOM Blk 973	Contracted-Mobil Oil
LOUISIANA - UNDESIGNATED										
Anderson-Barnett Drlg	1	Barge	10.00	5000	National 55	11,000	11	8		Drilling
	2	Barge	10.00	5000	Ideco M-2500	25,000	18	10		Drilling
	3	Barge	13.63	10000	Ideco E-3000	30,000	28			Drilling
Atlantic Pacific Marine	11	Barge	10.00	5000	Gar-Den DW-500R	9,000	13			Delivery 9-1-81
	12	Barge		5000	OILWELL E-2000	25,000	13			Delivery 11-1-81
	14	Barge		5000	OILWELL E-2000	25,000	13			
Booker Drlg	11	Platform	10.00	5000	Gar-Den 3000					Stacked
	90	Platform	10.00	5000	Gar-Den 500					Stacked
	951	Platform	10.00	5000	Gar-Den 1000	10,000				Under Construction-Available
	952	Platform	13.63	5000	Gar-Den 1000	10,000				Under Construction-Available
Chiles Drlg	Platform 2	Platform	13.63	10000	National 1320-UE	20,000				Under Construction
CRC Mallard Well Inc	35				Hyd	10,000		100	Gulf of Mexico	Drilling
Diamond M	Barge 14	Barge	13.63	5000	EMSCO J-1400	20,000	12	8	Gulf of Mexico	Drilling
	Barge 15	Barge	13.63	5000	Beth B-1013	14,000	10	8	Gulf of Mexico	Drilling
	Barge 16	Barge	13.63	5000	Ideco E-2500	25,000	12	8	Gulf of Mexico	Drilling
	Barge 26	Barge	13.63	5000	OILWELL 2000	20,000	12	8	Gulf of Mexico	Drilling
	Barge 40	Barge	13.63	5000	OILWELL 2000	25,000	12	8	Gulf of Mexico	Drilling
	Barge 5	Barge	13.63	5000	Brewster N-12-A	18,000	10	7	Gulf of Mexico	Drilling
	Gem	Jackup	13.63	5000	OILWELL E-3000	30,000	300	180	Gulf of Mexico	Drilling
	Rig 99	Jackup	13.63	5000	OILWELL 3000	30,000	300	45	Gulf of Mexico	Drilling
	41	Barge-Posted	13.63	5000	OILWELL 2000	25,000	18	16	Gulf of Mexico	Drilling
	42	Barge-Posted	13.63	5000	OILWELL 2000	25,000	18	12	Gulf of Mexico	Drilling
	46	Barge-Posted	13.63	10000	OILWELL E-3000	30,000	22		Gulf of Mexico	Drilling
	92	Platform	14.00	5000	National 110-UE	16,000			Gulf of Mexico	Drilling
	93	Platform	14.00	5000	National 110-UE	16,000			Gulf of Mexico	Drilling
	97	Platform	13.63	5000	OILWELL E-2000	25,000			Gulf of Mexico	Drilling
	94	Platform	13.63	5000	OILWELL E-2000	20,000			Gulf of Mexico	Drilling
	95	Platform	13.63	5000	OILWELL E-2000	25,000			Gulf of Mexico	Drilling
Dixilyn-Field Drlg	76	Submersible	13.63	5000	Brewster N-12-A	20,000	80	80		Available
Dolphin Intl	54	Tender/Platform	10.00	5000	Ideco H-725	20,000				Yard
	75	Platform	13.63	5000	National 110-UE	16,000				Yard
	78	Platform	13.63	5000	National 2320-UE	25,000				Yard
Glendel Drlg	Mr A W	Barge	13.63	10000	Brewster NE-12	25,000	12			Under Construction
	Mr Carl	Barge	13.63	10000	Brewster NE-12	25,000	12			Under Construction
Harris Well Serv	16	Barge	7.16	5000	M-CSCO U-36-A	10,000	12	12		Working
Helmerich & Payne Intl Drlg	90	Platform	13.63	5000	OILWELL E-3400	20,000		147	Gulf of Mexico	Available
Houston Offshore Intl	Sabine III	Jackup	13.63	10000	National 1320-UE	20,000	200			Under Construction
Keydril	Aleutian Key	Semisubmersible	18.75	10000	OILWELL E-3000	25,000		2000		Drilling
	Grand Key	Platform	13.63	10000	Ideco E-3000	25,000	80			Drilling
	Key Manhattan	Jackup	13.63	10000	National 1625	25,000	350			Drilling
Marlin Drlg	Marlin 4	Jackup	13.63	1000	National 1625-DE	25,000	150			Ship Yard-Repairs
Nicklos Drlg	Mr John 21	Barge			National 130					Gulf of Mexico
	20 Mr E J	Barge			National 130	20,000		12	Gulf of Mexico	
	27	Platform			National 110-UE	16,000		250		Gulf of Mexico
	30	Tender			National 110	16,000		240		Gulf of Mexico
Noble Drlg	24	Platform	13.63	10000	National 1625-DE	25,000			Avondale Shipyard	Stacked
	27	Platform	13.63	10000	Gar-Den 1100-E	18,000			Avondale Shipyard	Stacked
Offshore Co	Offshore Pegasus	Jackup	10.00	5000	National 110	16,000	125		Gulf Coast	Overhaul
Phoenix Management	#3	Posted Barge	10.63	10000	Gar-Den 2100-E	30,000/5"	21			Under Construction
Pool Offshore	Rig #11	Platform	13.63	5000	National 110-H	16,000				Job Waiting
Santa Fe Drlg	Blue Water No 2	Submersible	13.63	10000	National 1625-DE	25,000	55		Gulf of Mexico	Operating
	Blue Water No 4	Semisubmersible	16.75	10000	EMSCO C-3	25,000	1500		Gulf of Mexico	Operating
	Choctaw I	Semisubmersible	18.75	10000	National 1320-UE	20,000	800		Gulf of Mexico	Operating
	Mariner 3	Semisubmersible	16.75	10000	OILWELL E-2000	20,000	600	600	Gulf of Mexico	Operating
Temple Drlg	Cheyenne	Jackup	13.63	10000	OILWELL E-2500	25,000	200			Under Construction
	Tejas	Barge	13.63	10000	Ideco E-3000	30,000	20			Under Construction
LOUISIANA - BAY MARCHARD										
Dolphin Intl	5	Jackup	10.00	5000	Ideco H-35-D	15,000	10-70		Blk 24	Workover
LOUISIANA - BAYOU SALE										
Cliffs Drlg	2	Barge	13.63	10000	M-CSCO U-1220-EB	30,000	7'6-18			Drilling
LOUISIANA - BRETON SOUND										
CRC Mallard Well	34		6.00		Hydraulic	10,000		100	Blk 29	Workover

Contractor	Rig name or no.	Type	BOP Stack		Drwwks make & model	Rated drlg depth with $4\frac{1}{2}$ in. pipe	Water Depth		Location	Status
			Size (ID)	Pressure rating			Rated	Current		
UNITED STATES (Cont'd)										
LOUISIANA - BRETON SOUND (Contd)										
Eagle Offshore Drlg Serv	Eagle M-101	Barge	13.63	10 Kpsi	OILWELL E-3000	30,000	20	20	Blk 2	Working
Penrod Drlg	Barge 46	Barge	13.63	10000	EMSCO ECB	20,000	16	81		Drilling
Phoenix Management	Big Foot Two	Jackup	10.63	10000	Gar-Den 2100-E	25,000/5"	85	42	Blk 56	Drilling
Transworld Drlg	62	Jackup	13.63	10000	EMSCO C-3 Type II	25,000	300		Blk 40	Drilling-Phillips
LOUISIANA - CAMERON										
CRC Mallard Well	Barge 3	Barge			National 55	9,000				Workover
Noble Drlg	29	Platform	13.63	10000	Gar-Den 1500-E	20,000			Blk 334-C	Working
Resource Drlg	W M Keck Sr	Barge	13.63	5000	National 160	25,000		6		
Two R Drlg	Two R-12	Barge			National 1625-UE	25,000	12	8		Drilling
Wilson Bros	Barge A	Barge Non-Posted	13.63	5000	Ideco H-1700	16,500	12	8	Inland-Calcasieu Lake	Moving On Location
LOUISIANA - CHANDELEUR SOUND										
Cliffs Drlg	3	Barge	13.63	10000	M-CSCO U-1220-EB	30,000	7'6-18		Blk 2	Drilling
LOUISIANA - DEER ISLAND										
Penrod Drlg	Barge 44	Barge			National 1625-DE	30,000	10			Drilling
LOUISIANA - EAST CAMERON										
Booker Drlg	14	Platform	10.00	5000	Gar-Den 3000				Blk 272-A	Workover
	50	Platform	10.00	5000	Gar-Den 500				Blk 294-A	Workover
Dixilyn-Field Drlg	84	Jackup	13.63	10000	National 818-MI	20,000	250		Blk 239	Drilling
Fluor Drlg Serv	Mr Dave #61	Jackup	13.63	10000	National C-1320-UE	20,000	250	113	GOM Blk 215	Contracted-Samedan Oil
	Mr Gus II	Jackup	13.63	5000	National 160-E	25,000	150	56	GOM Blk 76	Contracted-Union Oil
Global Marine Drlg	Glomar High Island II	Jackup	13.63	10000	National 1320-UE	20,000	250		Blk 71	Conoco
Houston Offshore Intl	Sabine II	Jackup	13.63	10000	National 1320-UE	20,000	200	123	Blk 231	Drilling
	Saline I	Jackup	13.63	10000	National 1320-UE	20,000	200	20	Blk 240	Drilling
Marine Drlg	Stormdrill V	Jackup	13.63	10000	National 130	20,000	115	43	Blk 33	Drilling
Marlin Drlg	Marlin No 6	Jackup			National 1625-DE	30,000	300	180	Blk 49-3	Drilling
Pool Offshore	Rig #3	Platform			National T-45	6,000			Blk 64-A	Working-Mobil
	Rig #452	Platform	13.63	5000	Pool	8,000			Blk 336-A	Working-Tranxco
Salen Protexa Drlg	Zapofeca	Jackup	13.63	10000	M-CSCO U-1220-BE	25,000	250		Blk 118	Drilling
Service Equipment & Engrg	10	Platform	10.00		OIME 750	10,000			Blk 359	Working
	6	Platform	10.00		OIME 750	10,000			Blk 229	Working
Teledyne Movible Offshore	14	Platform			Gar-Den RE-500	7,500			Blk 321	
	19	Jackup			EMSCO MC-3	25,000		250	Blk 41	
	6	Platform			National 1320-DE	20,000			Blk 222	
LOUISIANA - EAST GOLDEN MEADOW										
Atlantic Pacific Marine	3	Barge	10.00	5000	National Ideal 110	14,000	9			Drilling
LOUISIANA - EUGENE ISLAND										
Atwood Oceanics	Vicksburg	Jackup	13.63	10000	EMSCO C-2	20,000/5"	300	70	Blk 106-1	Drilling
Bokenkamp Drlg	Rig #3	Platform	13.63	10000	OILWELL E-2000	25,000			Blk 354	Drilling
Booker Drlg	110	Platform	10.00	5000	Gar-Den 500				Blk 215-C	Workover
	120	Platform	10.00	5000	Gar-Den 500				Blk 330-A	Workover
	130	Platform	10.00	5000	Gar-Den 500				Blk 330-A	Workover
	150	Platform	10.00	5000	Gar-Den 500				Blk 276-B	Drilling
Cactus Intl	103	Platform			OILWELL 2000	25,000			Blk 257	Drilling
	104	Platform	13.63	5000	OILWELL	25,000			Blk 175	Drilling
Cliffs Drlg	4	Barge	13.63	10000	M-CSCO U-1220-EB	30,000			Blk 9	Drilling
Dolphin Intl	12	Platform	13.63	10000	Gar-Den 2100-E	25,000			Blk 108	Drilling
Global Marine Drlg	Glomar Java Sea	Drillship	18.75	10000	National 1625-DE	25,000	1500	1500	Blk 363	Arco
Huthnance Drlg	12	Platform	13.63	10000	Unit 12-20	25,000			Blk 238	Contracted-Gulf
	14	Platform	13.63	10000	Unit 12-20	25,000			Blk 341	Contracted-Chevron
Marine Drlg	J Storm XIV	Jackup	13.63	10000	National 1320	20,000	200	87	Blk 175	Drilling
Ocean Drlg & Expl	El Dorado	Submersible	13.63	5000	EMSCO EDES	25,000	70	70	Blk 24	Contract-OPCO
	Ocean Scout	Semisubmersible	13.63	10000	EMSCO C-3 Type 2	25,000	600	600	Blk 283	Contract-Transco
	Odeco Seven	Submersible	13.63	5000	Ideco E-2500	25,000	35	35	Blk 52	Drilling
Pool Offshore	Rig #8	Platform	10.00	5000	National T-45	6,000			Blk 259-B	Working-Shell
	Rig 423	Platform	13.63	5000	OIME 1000-E	12,000			Blk 392-A	Working-CNG
	140	Platform	10.00	5000	Ideco	8,000			Blk 294-A	Working-Texaco
	15	Platform			National T-45	6,000			Blk 251-A	Working-Exxon
Salen Protexa Drlg	Salenergy I	Jackup	13.63	10000	M-CSCO U-1220-EB	25,000	250	168	Blk 240	Drilling
Service Equipment & Engrg	21	Platform	13.63	1000	Ideco 2100	2,500			Blk 309	Working
Zapata Offshore	Louisiana	Submersible	13.63	5000	Unit U-1220-BE	20,000	50	22	Blk 62	Drilling-Hunt
	Zapata Explorer	Jackup	13.63	10000	OILWELL 3000-E	25,000	240	90	Blk 182	Drilling-Exxon
LOUISIANA - GARDEN BANKS										
Dual Marine Drlg	23	Platform	13.58	10000	OILWELL E-3000	25,000			Blk 236	Drilling
LOUISIANA - GRAND ISLAND										
Booker Drlg	30	Platform	10.00	5000	Gar-Den 500				Blk 76-A	Workover
	70	Platform	10.00	5000	Gar-Den 500				Blk 43-Q	Workover
Livingston Oilwell Serv	12 Workover	Platform	2.50	5000	Wilson Super	8,000/2⅞"			Blk 16	Concentric Work
	15 Workover	Platform	2.50	5000	Wilson Super 38	8,000/2⅞"			Blk 16	Workover
	3 Workover	Platform	2.50	5000	Wilson Super	8,000/2⅞"			Blk 16	Concentric Work
Penrod Drlg	63	Jackup	13.63	10000	National 1320-UE	25,000	250	26		Drilling
LOUISIANA - GREEN CANYON										
Zapata Offshore	Zapata Concord	Semisubmersible	18.75	10000	OILWELL E-3000	25,000	2000	328	Blk 184	Drilling-Conoco
	Zapata Yorktown	Semisubmersible	18.75	10000	OILWELL E-3000	25,000	2000	1097	Blk 134	Drilling-Exxon
LOUISIANA - HIGH ISLAND										
CRC Mallard Well	46		13.63		Wilson Model 65	12,500			Blk 531-B	Workover
Dolphin Intl	79	Platform	13.63	10000	EMSCO A-1000-E	25,000			Blk 315-A	En Route
Fluor Drlg Serv	Mr Sam #55	Jackup	13.63	5000	Gar-Den 1500-RE	25,000	155	47	GOM Blk 105	Contracted-Rutherford Oil
Platform Well Serv	8	Platform	10.00	5000	OIME 750	16,000/2⅞"			Gulf of Mexico	Workover
Pool Offshore	7	Platform	13.63	5000	National 110	16,000			Blk 414	Working-Houston & Min
Service Equipment & Engrg	11	Platform	13.63	5000	Ideco E-900	14,000			Blk 499	Working
Teledyne Movible Offshore	4	Platform			National 110-UE	16,000			Blk 595-A	
LOUISIANA - HONEY ISLAND										
Penrod Drlg	Barge 48	Barge	13.63	10000	National 1625-DE	30,000	20	176		Drilling
LOUISIANA - IBERIA										
CRC Mallard Well	Barge 9	Barge			Wilson Model 90	11,000				Shipyard
	Mallard 43	Platform	10.00		Wilson Model 65	14,000				Stacked
Penrod Drlg	Barge 43	Barge			National 1320-DE	25,000	12			Drilling

Contractor	Rig name or no.	Type	BOP Stack		Drwwks make & model	Rated drlg depth with 4½ in. pipe	Water Depth		Location	Status
			Size (ID)	Pressure rating			Rated	Current		
UNITED STATES (Cont'd)										
LOUISIANA - IBERIA (Contd)										
Rebstock Drlg	4	Barge	13.63	5000	OILWELL 860	18,000	12	9	Delcambre Well No 3	Drilling
Wheless Drlg	Barge 15	Barge	12.00	5000	National 130	25,000	12	8		Completing
LOUISIANA - IBERVILLE										
Glendel Drlg	Mr Del	Barge	13.63	10000	Brewster NE-12	25,000	20	10	Perre Pound	Drilling
	Mr Glen	Barge	13.63	10000	Brewster NE-12	25,000	12	8	Bayou Sorrel	Drilling
LOUISIANA - JEFFERSON										
Noble Drlg	S-55	Semisubmersible	13.63	10000	National 1625-DE	25,000	80		Grand Isle	Working
Two R Drlg	Two-18	Barge			EMSCO C-3	25,000	12	8		Drilling
LOUISIANA - LAFOURCHE										
Livingston Oilwell Serv	20 Workover	Barge	2.50	5000	Wilson Super 38	10,000/2⅞"	10		Timbalier Bay	Concentric Work
Noble Drlg	Barge 7	Barge			National 1320-M	20,000				Working
Shank Drlg Dean	DS-3	Barge	10.00	5000	Bethlehem B-3661	25,000	12	10	Bay Trambeau	Working
Two R Drlg	Two R-14	Wilson 250			Wilson 250	25,000	20	8		Drilling
	Two R-16	Barge			EMSCO C-3	25,000	12	8		Drilling
	Two R-2	Barge			EMSCO B-3661	25,000	10	8		Drilling
Wheless Drlg	Barge 14	Barge	12.00	5000	EMSCO J-1400	18,000	12	8		Completing
LOUISIANA - LITTLE LAKE										
Atlantic Pacific Marine	4	Barge	10.00	5000	EMSCO A-1500	20,000	12			
LOUISIANA - LIVINGSTON										
Rebstock Drlg	3	Barge	10.00	5000	Gar-Den 800	13,000	12	10	S/T 8776 Well No 1	Drilling
LOUISIANA - MAIN PASS										
Booker Drlg	140	Platform	10.00	5000	Gar-Den 500				Blk 311-A	Completion
Circle Bar Drlg	Rig 2 Liberty	Barge	10.00	5000	National 160-E	25,000	15	20	Blk 41	Working
	Rig 5 Mr Mecom			10000	Ideco E-3000	30,000	15		Blk 41	Working
Livingston Oilwell Serv	11 Workover	Platform	2.50	5000	Wilson Super	8,000/2⅞"			Blk 306	Concentric Work
Loffland Bros	4	Platform	13.63	5000	M-CSCO U-1220-BE	22,000			Blk 73-A	Drilling
	74	Platform	13.63	5000	M-CSCO U-1220-BE	22,000			Blk 73	Drilling
Penrod Drlg	Barge 47	Barge			EMSCO A-1500-E	25,000	16			Drilling
Pool Offshore	Rig #14	Platform			National T-45	6,000			Blk 41-F	Working-Chevron
	Rig #17	Platform	13.63	5000	OIME 1500	16,000			Blk 306-5	Working-Marathon
	Rig #5	Platform	10.00	5000	National T-45	6,000			Blk 72-C	Working-Mobil
Service Equipment & Engrg	9	Platform	10.00		OIME 750	10,000			Blk 305	Working
Transworld Drlg	45	Submersible	10.00	5000	National 125	15,000	35		Blk 21-B	Drilling-Kerr-McGee
LOUISIANA - MISSISSIPPI										
Nordic Offshore Drlg	Havdrill 31	Drillship			National 1625-DE	20,000			Blk 148-B	Working
LOUISIANA - MISSISSIPPI CANYON										
Dolphin Intl	76	Platform	13.63		Ideco E-1700	20,000			Blk 311	Drilling
Penrod Drlg	34	Platform	13.63	10000	National 110-UE	16,500	300			Drilling
LOUISIANA - MORGAN CITY										
Cactus Intl	102	Platform	13.63	5000	EMSCO C-2	25,000				Stacked
	162	Platform	13.63	5000	EMSCO A-1500	25,000				Waiting on Platform
	163	Platform	13.63	5000	EMSCO Electro-hoist II	25,000				Stacked
Penrod Drlg	37	Platform	13.63	10000	EMSCO C-2	25,000	300			Repair
	50	Submersible	13.63	10000	EMSCO A-1500-E	25,000	50	36		Repair
Reading & Bates Drlg	OS-7	Platform	13.63	5000	National 110	18,000			Gulf of Mexico	Available
LOUISIANA - PLAQUEMINES										
Cliffs Drlg	1	Barge	13.63	10000	M-CSCO U-1220-EB	30,000	18			Drilling
CRC Mallard Well	Barge 1	Barge			Wilson Model 90	9,000				Workover
Diamond M	Rig 47	Posted Barge	13.63	5000	OILWELL E-3000	25,000	22		Gulf of Mexico	Drilling
Helmerich & Payne Intl Drlg	91	Platform	13.63	5000	OILWELL 2000	20,000			Gulf of Mexico	Drilling
Livingston Oilwell Serv	18 Workover	Barge	6.00	5000	Wilson Mogul 42	18,000/2⅞"	12			Drilling & Workover
	24		10.75	5000	Wilson Super Giant	12,000	12		America Bay	Drilling
Noble Drlg	26	Platform	13.63	10000	National 1320-UE	20,000			Blk 57-A	Working
	30	Platform	13.63	10000	Gar-Den 1500-E	20,000			W Delta Blk 117G	Working
Rebstock Drlg	2	Barge	10.00	5000	National N-80	14,000	12	8	Delacrois Well No 7-7	Drilling
Two R Drlg	Two R-10	Barge			National 1320-M	20,000	10	8		Drilling
	Two R-15	Barge			EMSCO C-3	25,000	10	7		Drilling
LOUISIANA - SABINE PASS										
Houston Offshore Intl	Nueces I	Jackup	13.63	10000	National 1320-UE	16,000	125	38	Blk 17	Drilling
Transworld Drlg	64	Jackup	13.63	10000	OILWELL E-3000	25,000	300		Blk 3	Drilling-Superior
LOUISIANA - SHIP SHOAL										
Booker Drlg	950	Platform	13.63	5000	Gar-Den 1000	10,000			Blk 295-A	Drilling
Chiles Drlg	Gulf Wind	Jackup	13.63	10000	National 1320-UE	18,000/5"	150	70		Drilling
CRC Mallard Well	Mallard 33		6.00		Hydraulic	8,000		60	Blk 133	Workover
Dolphin Intl	77	Platform	13.63	5000	EMSCO U-1220-EB	25,000			Blk 224	Drilling
Loffland Bros	17	Platform	13.63	5000	M-CSCO U-1220-EB	22,000			Blk 214K	Drilling
Marine Drlg	J Storm XII	Jackup	13.63	10000	National 1320	20,000	200	123	Blk 232	Drilling
Marlin Drlg	Marlin No 2	Platform	13.63	5000	National 1320-DE	20,000		230	Blk 198 I-12	Drilling
Ocean Drlg & Expl	Ocean Driller	Semisubmersible	13.63	5000	EMSCO C-2	25,000	600	600	Blk 111	Contract-OPCO
	Ocean Liberty	Jackup	13.63	5000	National 80	12,000	80	80	Blk 114	Contract-OPCO
	Ocean Viking	Semisubmersible	13.63	5000	EMSCO A-1500	25,000	600	600	Blk 114	Contract-OPCO
Pool Offshore	142	Platform			National 110	9,000			Blk 219-A	Working-Amoco
Salen Protexa Drlg	Salenergy V	Jackup	13.63	10000	M-CSCO U-1220-BE	25,000	250		Blk 91	Drilling
Service Equipment & Engrg	3	Platform	10.00		Cabot/Franks 1287				Blk 223	Working
	5	Platform	10.00		OIME 750	10,000			Blk 245	Working
Temple Drlg	Comanche	Jackup	13.63	10000	OILWELL E-2000	25,000	150	80	Blk 169	Drilling
Transworld Drlg	44	Submersible	10.00	5000	Ideco 1350-S	18,000	40		Blk 28-B	Working
	54	Submersible	13.63	5000	EMSCO B-3661	20,000	175		Blk 217	Drilling-Kerr-McGee
LOUISIANA - SOUTH IBERIA										
CRC Mallard Well	44	Platform	10.00		Wilson Model 65	14,000				Stacked
LOUISIANA - SOUTH MARSH ISLAND										
Bokenkamp Drlg	Rig #1	Platform	13.63	10000	OILWELL E-2000	25,000			Blk 33	Drilling
Booker Drlg	100	Platform	10.00	5000	Gar-Den 500				Blk 137-A	Workover

			BOP Stack				Water Depth			
Contractor	Rig name or no.	Type	Size (ID)	Pressure rating	Drwwks make & model	Rated drlg depth with 4½ in. pipe	Rated	Current	Location	Status
					UNITED STATES (Cont'd)					
LOUISIANA - SOUTH MARSH ISLAND (Contd)										
Booker Drlg	15	Platform	10.00	5000	Gar-Den 3000				Blk 61-B	Workover
	20	Platform	10.00	5000	Gar-Den 500				Blk 130-C	Completion
CRC Mallard Well	Mallard 42	Platform	10.00		Wilson Model 65	14,000			Blk 50	Workover
Global Marine Drlg	Glomar Tender II	Tender	16.75	5000	National 1625-DE	25,000			Gulf of Mexico Blk 76	Aminoil
Livingston Oilwell Serv	17 Workover (Concentric)	Platform	2.50	5000	Wilson Super 38	8,000/2⅞"			Blk 73	Concentric Work
Marlin Drlg	Marlin No 5	Platform	13.63	10000	National 1320-DE	20,000		215	Blk 136-B9	Drilling
Ocean Drlg & Expl	Ocean 66	Jackup	13.63	5000	EMSCO C-3 Type 2	25,000	120	120	Blk 288	Drilling
Offshore Co	Rig 25	Platform	13.63	5000	National 130-E	15,000		205		Working
Penrod Drlg	38	Platform	13.63	10000	National 1320-UE	25,000	300			Drilling
	54	Jackup	13.63	10000	National 1625-DE	30,000	300	83		Drilling
	83	Jackup	13.63	10000	National 1320-DE	25,000	250	28		Drilling
Pool Offshore	Rig #2	Platform	10.00	5000	National T-45	6,000			Blk 296	Working-Placid
Rowan Co	Rowan Fort Worth	Jackup	13.63	10000	National 1625	25,000			Blk 113	Drilling
Teledyne Movible Offshore	5	Platform			National 1320-D	2,000			Blk 130-D	
LOUISIANA - SOUTH PASS										
Bokenkamp Drlg	Rig #2	Platform	13.63	10000	OILWELL E-2000	25,000			Blk 77	Drilling
Cactus Intl	165	Platform	13.63	5000	EMSCO Electro-hoist II	25,000			Blk 78	Drilling
Dolphin Intl	4	Jackup	6.00	5000	Ideco H-35-D	15,000			Blk 27	Workover
Huthnance Drlg	15	Platform	13.63	5000	Unit 12-20	25,000			Blk 49-A	Contracted-Gulf
Marlin Drlg	Marlin 15	Platform	13.63	1000	National 1320-DE	20,000			Blk 148	Drilling
	Marlin 16	Platform	13.63	1000	National 1320-DE	20,000			Blk 148	Drilling
Ocean Drlg & Expl	Ocean Pride	Jackup	13.63	5000	National 110	18,000	152	152	Blk 42	Drilling
Penrod Drlg	35	Platform	13.63	10000	National 1320-UE	16,500	300	20		Drilling
Pool Offshore	453	Platform	13.63	5000	OIME 1500	16,000			Blk 89-A	Working-Marathon
Teledyne Movible Offshore	13	Platform			EMSCO WS-1	8,500			Blk 60	
	2	Submersible			National 1625-DE	25,000		70	Blk 27	
LOUISIANA - SOUTH PELTO										
Dolphin Intl	3	Jackup	6.00	5000	Ideco H-35-D	15,000			Blk 20	Workover
Mayronne	M-162	Platform	13.63	10000	National 1320-UE	20,000			Blk 1	Drilling-Amoco
Ocean Drlg & Expl	St Louis	Submersible	10.00	5000	EMSCO EDES	25,000	30	30	Blk 19	Contract-Quintana
Pool Offshore	6	Platform	10.00	5000	National T-45	7,000			Blk 65	Working-Shell
Rowan Co	Rowan Paris	Jackup	13.63	10000	National 1625	25,000			Blk 21	
Transworld Drlg	59	Jackup	13.63	5000	National 1320-UE	20,000	125		Blk 9	Drilling-Mobil
LOUISIANA - SOUTH TIMBALIER										
Dolphin Intl	10	Platform	13.63	10000	EMSCO C-3 Type II	25,000			Blk 165-E	Drilling
	8	Platform	13.63	10000	EMSCO C-3 Type II	25,000			Blk 35	Drilling
Fluor Drlg Serv	Mr Si #60	Jackup	13.63	10000	National 1625-DE	30,000	350	115	GOM Blk 195	Contracted-Gulf Oil
Marlin Drlg	Marlin 3	Jackup	13.63	1000	National 1625-DE	25,000	250	141	148-4	Drilling
Ocean Drlg & Expl	Gulftide	Jackup	13.63	10000	National 1625-DE	25,000	250	250	Blk 177	Drilling
	Ocean Chief	Jackup	13.63	5000	EMSCO A-1500	25,000	225	225	Blk 172	Drilling
	Ocean Patriot	Jackup	13.63	5000	National 1320-ME	25,000	152	152	Blk 17	Contract-OPCO
	Ocean Star	Jackup	13.63	5000	National 1320-UE	25,000	173	175	Blk 196	Contract-Tenneco
Pool Offshore	51	Jackup	10.00	5000	OIME 750	10,000	80		Blk 50	Working-Kerr-McGee
	9	Platform	13.63	5000	National T-45	6,000			Blk 161-D	Working-Amoco
Reading & Bates Drlg	Geo M Reading	Platform/Tender	20.00	5000	Ideco M-2500	20,000			Blk 161	Amoco Until 10/81
Service Equipment & Engrg	12	Platform	13.63	500	Ideco E-900	14,000			Blk 53	Working
	4	Platform	10.00		OIME 500				Blk 186	Working
	7	Platform	10.00		OIME 750	10,000			Blk 135	Working
LOUISIANA - ST BERNARD										
Blocker Drlg & Marine	Trinity Bay	Barge	13.63	10000	Ideco E-3000	30,000			S/T 7739-1	Drilling
Goldrus Marine Drlg	Goldrus Marine 2	Barge	13.63	10000	OILWELL 3000-E	30,000	20	8	Chandeleur Sound	Drilling
LOUISIANA - ST MARTIN										
Goldrus Marine Drlg	Goldrus Marine 1	Barge	13.63	10000	OILWELL 3000-E	30,000	20	8	W Mystic Bayou	Drilling
Wheless Drlg	Barge 9	Barge	12.00	5000	Ideco 2500	25,000	12	8		Drilling
LOUISIANA - ST MARY										
Atlantic Pacific Marine	8	Barge	13.63	5000	OILWELL 2000	25,000	20			
Circle Bar Drlg	Rig 7		10.00	10000	OILWELL 3000	30,000			Rabbit Island	Working
CRC Mallard Well	Barge 4	Barge			National 80	11,000			Point A	
	Barge 7	Barge			National 55	11,000				Workover
Livingston Oilwell Serv	5 Workover	Barge	6.00	5000	Wilson Mogul 42	13,000/2⅞"	10		Deer Island	Workover
Loffland Bros	Barge 153	Barge	10.00	5000	Bethlehem 1013	15,000				Drilling
LOUISIANA - TERREBONNE										
Blocker Drlg & Marine	Terrebonne Bay	Barge	13.63	5000	OIME SL-9-E	20,000	12	12	S/T 7930-1	Drilling
Circle Bar Drlg	Rig 6 Delta	Submersible	10.00	10000	OILWELL 940 Electric	18,000	35	30		Working
Livingston Oilwell Serv	14 Workover	Barge	6.00		Wilson Super 38	10,000/2⅞"	12		Lirette Field	Workover
	21 Workover	Platform	6.00	5000	National T-12	14,000/2⅜"				Available
	23 Workover	Platform	6.00	5000	Wilson Mogul 42	15,000/2⅞"				Available
	40 Workover	Platform	4.16	10000	Hydra LHD 135-T	12,000/2⅜"				
	41 Workover	Platform	4.16	10000	Hydra LHD 135-T	12,000/2⅜"				
	7 Workover	Platform	2.25	5000	Wilson Super	12,000/1"				Standby
	9 Workover (Concentric)	Platform	2.50	5000	Wilson Super	8,000/2⅞"				
Loffland Bros	Barge 143	Barge	10.00	5000	M-CSCO U-1220	22,000				Drilling
	Barge 154	Barge	10.00	5000	M-CSCO U-1220	22,000				Drilling
Merit Drlg	2	Posted Barge	13.63	10000	OILWELL E-2000	25,000	20	12	Four League Bay	Contracted
	3	Posted Barge	13.63	10000	OILWELL E-2000	25,000	20	12	Atchafalaya Bay	Contracted
Noble Drlg	Barge 4	Barge			National 160-S	25,000			Lake Barre	Working
Shank Drlg Dean	DS-2	Barge	10.00	5000	Wilson 150-2000	18,000	10	8	Orange Grove Field	Working
Two R Drlg	Two R-1	Barge			Bethlehem B-3661	25,000	10	8		Drilling
	Two R-6	Barge			EMSCO	25,000	12	8		Drilling
Wheless Drlg	Barge 5	Barge	12.00	5000	EMSCO J-1400	20,000	15	12		Moving
	Barge 8	Barge	12.00	5000	National 130	20,000	12			Repairs
LOUISIANA - VERMILION										
Booker Drlg	60	Platform	10.00	5000	Gar-Den 500				Blk 156-A	Workover

Contractor	Rig name or no.	Type	BOP Stack		Drwwks make & model	Rated drlg depth with 4½ in. pipe	Water Depth		Location	Status
			Size (ID)	Pressure rating			Rated	Current		
UNITED STATES (Cont'd)										
LOUISIANA - VERMILION										
Global Marine Drlg	Glomar High Island I	Jackup	13.63	10000	National 1320-UE	20,000	250	250	Blk 25	McMoran
Goldrus Marine Drlg	Goldrus Marine 3	Barge	13.63	10000	OILWELL 3000-E	30,000	20	8		Drilling
	Goldrus Marine 4	Barge	13.63	10000	OILWELL 3000-E	30,000	20	8		Drilling
Noble Drlg	Barge 3	Barge			National 1320-UE	20,000			Weeks Bay	Working
Ocean Drlg & Expl	John Hayward	Submersible	13.63	5000	EMSCO EDA	25,000	30	30	Blk 17	Drilling
	Ocean Queen	Semisubmersible	13.63	5000	EMSCO A-1500	25,000	1200	1200	Blk 76	Drilling
Penrod Drlg	82	Jackup	13.63	10000	National 1320-DE	25,000	250	250		Drilling
Phoenix Management	Big Foot One	Jackup	10.63	10000	Gar-Den 2100-E	25,000/5"	85	29	Blk 67	Drilling
Pool Offshore	425	Platform	13.63	5000	OIME 1000	16,000			Blk 380-A	Working-Texaco
	454	Platform	13.63	10000	OIME 1500	16,000			Blk 369-B	Working-Marathon
Reading & Bates Drlg	N J Guilbeau	Tender/Platform	13.63	5000	National 1320	18,000			Blk 250	Tenneco Until 10/81
	63	Platform	13.63	5000	OILWELL E-3000	25,000			Blk 226-A	McMoran 12/82
Salen Protexa Drlg	Salenergy III	Platform	13.63	10000	M-CSCO U-1220-EB	25,000			Blk 27	Drilling
	Totonaca	Jackup	13.63	10000	M-CSCO U-1220-BE	25,000	250		Blk 326	Under Construction
Teledyne Movible Offshore	18	Jackup			M-CSCO U-1220-EB	25,000		250	Blk 25	
	3	Submersible			EMSCO EDES	20,000		45	Blk 26	
Two R Drlg	17	Barge			EMSCO Model C-E-C-3	25,000	22	20	Blk 5	Drilling
Wheless Drlg	Barge 7	Barge	12.00	5000	National 130	25,000	12	10		Drilling
	11	Barge	12.00	5000	OILWELL M-3000	30,000	18	12		Drilling
LOUISIANA - WEST CAMERON										
Atlantic Pacific Marine	Ranger IV	Jackup	10.00	5000	OILWELL 660	9,000	73		Blk 28	Delivery 12-15-81
Broughton Drlg	Broughton I	Jackup	13.63	10000	OILWELL E-3000	30,000	100	65	Blk 66 E-2	Drilling-Conoco
Cactus Intl	101	Platform	13.63	5000	EMSCO Electro-hoist II	25,000			Blk 648	Drilling
Circle Bar Drlg	Rig 8				OILWELL 3000	30,000		20	Blk 10	Working
Dixilyn-Field Drlg	85	Jackup	13.63	10000	National 1320-UE		200		Blk 542	Drilling
Dolphin Intl	6	Jackup	10.00	5000	Ideco H-35-D	15,000			Blk 32	Workover
	9	Platform	13.63	10000	EMSCO C-3 Type II	25,000			Blk 294	Drilling
Dual Offshore	16	Platform	13.58	5000	National 1320-UE	25,000/5"			Blk 630	Drilling
Global Marine Drlg	Glomar High Island III	Jackup	13.63	10000	National 1320-UE	20,000	250	250	Blk 199	Arco
	Glomar High Island IV	Jackup	13.63	10000	National 1320-UE	20,000	250	250	Blk 194	Mobil
Huthnance Drlg	Acadian Spirit	Jackup	13.63	10000	EMSCO C-2	25,000	112	25		Contracted-Superior
Livingston Oilwell Serv	16 Workover	Platform	2.50	5000	Wilson Super	8,000/2⅞"			Blk 245	Concentric Work
Loffland Bros	79	Platform	13.63	5000	M-CSCO U-1220-BE	22,000			Blk 205-K	Drilling
Marine Drlg	J Storm IV	Jackup	13.63	10000	National 1625-M	25,000	250	57	Blk 205	Drilling
	J Storm IX	Jackup	13.63	10000	National 1320	20,000	195	62	Blk 317	Drilling
	J Storm XI	Jackup	13.63	10000	National 1320	20,000	200	40	Blk 161	Drilling
Ocean Drlg & Expl	Barge A	Submersible	13.63	5000	Ideco 2500	25,000	70	70	Blk 81	Drilling
	Ocean Tempest	Drillship	[illegible]	10000	National 1625-DE	25,000	600	600	Blk 607	Contract-Mesa
Penrod Drlg	51	Submersible	13.63	10000	EMSCO A-1550-E	25,000	60	35		Drilling
	55	Jackup	13.63	10000	National 1625-DE	30,000	150	35		Drilling
	68	Jackup	13.63	10000	National 1625-DE	30,000	330	57		Drilling
Pool Offshore	50-Offshore	Jackup	10.00	5000	OIME 750	10,000	80	80	Blk 71-B	Working-Superior
	52	Jackup	10.00	5000	OIME 750	10,000	80		Blk 192	Working-Shell
	458	Platform	13.63	5000	OIME 1500	16,000			Blk 464-A	Working-McNoran
Salen Protexa Drlg	Salenergy IV	Jackup	13.63	10000	M-CSCO U-1220-BE	25,000	250		Blk 49	Drilling
Teledyne Movible Offshore	10	Platform			National T-45	8,500			Blk 624	
Transworld Drlg	47	Submersible	14.00	5000	EMSCO EDA 4-60	20,000	70		Blk 107	Drilling-Superior
	65	Submersible	13.63	10000	EMSCO C-3 Type II	25,000	70		Blk 72	Drilling-Superior
	68	Submersible	13.63	10000	EMSCO C-3 Type 2	25,000	100		Blk 147	Drilling-Kerr-McGee
LOUISIANA - WEST DELTA										
Bokenkamp Drlg	Rig #4	Platform	13.63	10000	OILWELL E-2000	25,000			Blk 109	Drilling
Booker Drlg	10	Platform	10.00	5000	Gar-Den 3000				Blk 73-A	Workover
	6	Platform	2.50	5000	Gar-Den 3000				Blk 73.	Workover
	8	Platform	2.50	5000	Gar-Den 3000				Blk 73-B	Workover
	80	Platform	10.00	5000	Gar-Den 500				Blk 68-U	Workover
CRC Mallard Well	45		10.00		Wilson 65	8,000			Blk 30	Workover
Dixilyn-Field Drlg	D-F 61	Platform	13.63	5000	National 1320-UE	20,000	20000		Blk 138	Drilling
Livingston Oilwell Serv	4 Workover	Platform	2.50	5000	Wilson Super	8,000/2⅞"			Blk 30	Concentric Work
	8 Workover	Platform	2.50	5000	Wilson Super 38	8,000/2⅞"			Blk 30	Concentric Work
Ocean Drlg & Expl	Ocean Explorer	Semisubmersible	13.63	5000	EMSCO EDES	25,000	600	600	Blk 27	Drilling
Platform Well Serv	7	Platform	6.00	5000	OIME 750	16,000/2⅞"			Gulf of Mexico	Workover
Pool Offshore	455		13.63	5000	OIME 1500	16,000			Blk 30-E	Working-Shell
Zapata Offshore	Rig 8	Platform	13.63	5000	EMSCO A-1100-E	15,000		172	Blk 73	Drilling-Exxon
MISSISSIPPI - PASCAGOULA										
Chiles Drlg	Yucatan	Jackup	13.63	10000	National 1625-DE	30,000	300			Under Construction
Huthnance Drlg	Vanguard I	Jackup	13.63	10000	EMSCO U-1220-EB	25,000	300			Contracted-Gulf
NEW JERSEY - MID ATLANTIC										
Western Oceanic	Alaskan Star	Semisubmersible	16.75	10000	EMSCO Model C-3 Type	25,000	1500		Baltimore Canyon	Drilling-Exxon
RHODE ISLAND - UNDESIGNATED										
Ocean Drlg & Expl	Ocean Victory	Semisubmersible	21.25/13.63	2000/10000	EMSCO C-3 Type 2	25,000	600	600		Preparing for North Sea
TEXAS - UNDESIGNATED										
Diamond M	Barge 29	Barge	13.63	5000	OILWELL 96	20,000	10	8	Gulf of Mexico	Drilling
	Century	Semisubmersible	18.75	10000	OILWELL E-3000	30,000	600	300	Gulf of Mexico	Drilling
	New Era	Semisubmersible	18.75	10000	OILWELL E-3000	30,000	1200	350	Gulf of Mexico	Drilling
	98	Platform	13.63	5000	EMSCO A-1500-E	20,000			Gulf of Mexico	Drilling
Global Marine Drlg	Global Jackup XI	Jackup	13.63	10000	National 1320-UE	25,000	300	300	Gulf of Mexico	
	Glomar Adriatic IV	Jackup	13.63	10000	National 1625-DE	25,000	300	300		Delv 5/83
	Glomar Adriatic V	Jackup	13.63	10000	National 1625-DE	25,000	300	300		Delv 8/83
	Glomar Adriatic VI	Jackup	13.63	10000	National 1625-DE	25,000	300	300		Delv 10/83
	Glomar Adriatic VII	Jackup	13.63	10000	National 1625-DE	25,000	300	300		Delv 1/84
	Glomar Adriatic VIII	Jackup	13.63	10000	National 1625-DE	25,000	300	300		Delv 12/82
	Glomar Arctic II	Semisubmersible	18.75	15000	OILWELL E-3000	25,000				Delv 10/82
	Glomar Arctic III	Semisubmersible	18.75	15000	OILWELL E-3000	25,000	600			Delv 5/83
	Glomar Bismarck Sea	Drillship	18.75	10000	National 1625-DE	25,000				Delv 2/83
	Glomar High Island IX	Jackup	13.63	10000	National 1320	20,000	250	250		Delv 11/82
	Glomar High Island VI	Jackup	13.63	10000	National 1320-UE	20,000	250	250	Gulf of Mexico	Samedan
	Glomar High Island VII	Jackup	13.63	10000	National 1320-UE	20,000	250		Gulf of Mexico	Texaco

Contractor	Rig name or no.	Type	BOP Stack		Drwwks make & model	Rated drlg depth with 4½ in. pipe	Water Depth		Location	Status
			Size (ID)	Pressure rating			Rated	Current		
UNITED STATES (Cont'd)										
TEXAS - UNDESIGNATED (Contd)										
Global Marine Drlg	Glomar High Island VIII	Jackup	13.63	10000	National 1320-UE	20,000	250	250		Delv 7/82
	Glomar High Island X	Jackup	13.63	10000	National 1320-UE	20,000	250	250		Delv 7/83
	Glomar Main Pass II	Jackup	13.63	10000	National 1625-DE	25,000	300	300		Delv 1/82
	Glomar Main Pass III	Jackup	13.63	10000	National 1625-DE	35,000	300	300		Delv 5/82
	Glomar Main Pass IV	Jackup	13.63	10000	National 1625-DE	35,000				Delv 9/82
Huthnance Drlg	Charger I	Jackup	21.25	2000	EMSCO U-1220-EB	25,000	150			Contracted-Superior
	Charger II	Jackup	13.63	10000	EMSCO U-1220-EB	25,000	150			Contracted-Superior
Keydril	Galveston Key	Jackup	13.63	10000	EMSCO C-3	25,000	300	300		Preparation for Tow to N Sea
Keyes Offshore	Keyes - 300	Jackup	13.63	10000	EMSCO 2000	20,000	300			Under Construction
	Keyes - 301	Jackup	13.63	10000	EMSCO 2000	16,000	300			Under Construction
	Keyes - 302	Jackup	13.63	10000	EMSCO 2000	20,000	300			Under Construction
	Keyes - 303	Jackup	13.63	10000	EMSCO C-II	16,000	300			Under Construction
Phoenix Management	#4	Hover Barge	10.63	10000	Gar-Den 2100-E	25,000/5"	10			Under Construction
Transworld Drlg	56	Platform	10.00	5000	EMSCO EDES	20,000				Stacked
Western Oceanic	Western Delta	Jackup	13.63	5000	National Type 80-UE	15,000	173		S/T 1064L	Contracted-McMoran
TEXAS - ARANSAS										
Dixilyn-Field Drlg	Barge 51	Barge			National 110		10			Drilling
Livingston Oilwell Serv	22	Barge	10.75	5000	Wilson Super Giant	12,000	12		TST-2 Well 1	Drilling
MGF Drlg	31	Barge	10.00	5000	OILWELL 76	12,000	10		Aransas Bay	Drilling
TEXAS - BRAZORIA										
Fluor Drlg Serv	Rig 62	Platform	13.63	10000	National 1320-UE	20,000			GOM Blk 19-A	Contracted-Shell Oil
TEXAS - BRAZOS										
Chiles Drlg	Gulfstream	Jackup	13.63	10000	National 110-UE	16,000	150	120	Blk 578	Drilling
	Platform 1	Platform	13.63	10000	National 1320-UE	20,000		125	Blk A-20	Drilling
Dixilyn-Field Drlg	DF-86	Jackup	13.63	10000	National 1320-UE	20,000	200		Blk 436	Drilling
Dual Rig 25 Ltd	25	Platform	13.58	10000	OILWELL E-3000	25,000/5"			Blk 132-A	Drilling
Marine Drlg	J Storm I	Jackup	13.63	10000	National 130	20,000	225	125	Blk A-7	Drilling
	J Storm VII	Jackup	13.63	10000	National 1625-M	25,000	377	200	Blk A-131	Drilling
	J Storm VIII	Jackup	13.63	10000	National 1320	20,000	150	121	Blk 542	Drilling
Ocean Drlg & Expl	Ocean Leader	Jackup	13.63	5000	National 130	25,000	175	175	Blk 578	Contract-Superior
Penrod Drlg	52	Jackup	13.63	10000	National 1320	25,000	250	250		Drilling
TEXAS - BROWNSVILLE										
Chiles Drlg	Seabee	Jackup	13.63	10000	National 1320-UE	20,000	250			Under Construction
Ocean Drlg & Expl	Ocean King	Jackup	13.63	10000	National 1625	25,000	300			Shipyard
TEXAS - CALHOUN										
Matagorda Drlg	3	Barge	10.00	3000	Brewster N-45	8,000	9		ST/TRK 72-W	Working
TEXAS - GALVESTON										
Marine Drlg	J Storm VI	Jackup	13.63	10000	National 1625-M	25,000	250	91	ST 392	Drilling
MGF Drlg	37	Barge	1000	5000	EMSCO GA-500	10,0000	10		Galveston Bay	Workover
Ocean Drlg & Expl	Ocean Traveler	Semisubmersible	13.63	10000	National 1625-DE	25,000	600	600		Contract-Superior
Teledyne Movible Offshore	17	Jackup			EMSCO M-C-3	25,000		250	Blk A-156	
TEXAS - GALVESTON BAY										
Atlantic Pacific Marine	1	Barge	10.00	5000	OILWELL 860	20,000	20			
TEXAS - HIGH ISLAND										
Dual Drlg	29	Platform	13.63	10000	EMSCO C-3	25,000/5"			Blk A-570	Under Construction
Huthnance Drlg	Rig No 11	Platform	13.63	5000	Unit U-12-20	25,000			Blk 343	Contracted-Exxon
Keyes Offshore	Keyes - 150	Jackup	13.63	10000	EMSCO C-1	20,000	150		Blk 10-L	Drilling
Loffland Bros	76	Platform	13.63	5000	M-CSCO U-1220-BE	22,000			Blk 582	Drilling
Marlin Drlg	Marlin #9	Platform	11.00	10000	National 610		175		Blk 270-BB	Completion Work
Mayronne	M-142	Platform	13.63	5000	Brewster N-12	18,000			Blk 280	Drilling-Exxon
	M-152	Platform	13.63	5000	Brewster N-20	18,000			Blk 193	Drilling-Exxon
Noble Drlg	28				Gar-Den 1500-E	20,000			Blk 564-B	Working
Penrod Drlg	31	Platform	13.63	10000	National 110-UE	16,500	300			Drilling
	36	Platform	13.63	10000	National 1320-UE	30,000	300	172		Drilling
	53	Jackup	13.63	10000	National 1625-DE	30,000	300	145		Drilling
	66 Mobile	Jackup	13.63	10000	National 1625-DE	30,000	210	56		Drilling
	69 Mobile	Jackup	13.63	10000	National 1625-DE	30,000	330	188		Drilling
Pool Offshore	Rig #136	Platform	13.63	5000	National 110	16,000			Blk 325-A	Working-Pennzoil
	456	Platform	13.63	5000	OIME 1500	16,000			Blk 542-A	Working-Sun Oil
	457	Platform	13.63	5000	National 110	12,000			Blk 568-A	Working-Marathon
Reading & Bates Drlg	Leo M Clark	Platform/Tender	20.00	5000	National 110-M	18,000			Blk 270	Contracted-Tenneco
	Rig 40	Platform	13.63	5000	National 1625	18,000			Blk 567-A	Mesa Until 8/82
Zapata Offshore	Intrepid	Jackup	13.63	10000	Unit U-1220-B	20,000/5"	300	135	Blk 138	Drilling-Conoco
	Vinegarroon	Jackup	13.63	10000	OILWELL 96	15,000	130	32	Blk 38	Drilling-Placid Oil
	29	Platform	13.63	10000	OILWELL E-2000	20,000		164	Blk 446	Drilling-McMoran
TEXAS - KENEDY										
Matagorda Drlg	Barge 2	Barge	10.00	3000	EMSCO D-2	9,500	9		ST/TRK 166-W1	
TEXAS - MATAGORDA										
Atlantic Pacific Marine	Gulf Commander	Jackup	13.63	5000	EMSCO A-800-WE	14,000	100		Blk 624	
	Ranger III	Jackup	10.00	5000	Gar-Den DW 500-R	9,000	70		Blk 660-L	
Broughton Drlg	Broughton II	Jackup	13.63	10000	OILWELL E-3000	30,000	100	62	Blk 625-L	Drilling-Texas Gas
CRC Mallard Well	Barge 5	Barge			National 80-B	11,000				Drilling
Keyes Offshore	Keyes - 250	Jackup	13.63	10000	EMSCO 2000	20,000	250		Blk 520	Drilling
Matagorda Drlg	5	Barge	10.00	3000	National T-45	9,500	16	14	ST/TRK 85-1	Working
	7	Barge	6.00	5000	National T-20	6,000	10		ST/TRK 4-A	Working
Teledyne Movible Offshore	16	Jackup			EMSCO C-3	25,000		250	Blk 600	
Western Oceanic	Western Triton II	Jackup	13.63	10000	National 1320	20,000	250			Contracted-McMoran
Zapata Offshore	Endeavour	Jackup	13.63	10000	EMSCO CE-3000-E	20,000	215	55	Blk 629-L	Drilling
TEXAS - MATAGORDA ISLAND										
Dixilyn-Field Drlg	80	Jackup	13.63	10000	National 1320-DE	20,000	370		Blk 558	Drilling
Global Marine Drlg	Glomar High Island V	Jackup	13.63	10000	National 1320-UE	20,000	250	250	Blk 680	Pennzoil
Loffland Bros	75	Platform	13.63	5000	M-CSCO U-1220-BE	22,000			Blk 686	Drilling
TEXAS - MUSTANG										
Transworld Drlg	50	Jackup	10.00	5000	National 55	12,000	70		S/T 926-S #1	Drilling-Mitchell Energy
TEXAS - MUSTANG ISLAND										
Dixilyn-Field Drlg	60	Platform	13.63	5000	National 110	16,000	15000		Blk 755	Drilling
Marine Drlg	J Storm X	Jackup	13.63	10000	National 1320	20,000	250	54	Blk 840	Drilling

			BOP Stack				Water Depth			
Contractor	Rig name or no.	Type	Size (ID)	Pressure rating	Drwwks make & model	Rated drlg depth with 4½ in. pipe	Rated	Current	Location	Status
				UNITED STATES (Cont'd)						
TEXAS - MUSTANG ISLAND (Contd)										
Moran Drlg	M	Jackup	13.63	10000	EMSCO C2	23,000	250	50	Blk 772-L	Drilling
Penrod Drlg	60	Jackup	13.63	10000	EMSCO C-3	30,000	330	214		Drilling
Reading & Bates Drlg	Randolph Yost	Jackup	13.63	10000	OILWELL E-3000	20,000	300		Blk 792-L	Conoco Until 10/82
	Rig 50	Platform	13.63	5000	National 1320	18,000			Blk 85-A	Contracted-Conoco Until 1/82
TEXAS - NORTH PADRE ISLAND										
Loffland Bros	78	Platform	13.63	5000	M-CSCO U-1220-BE	22,000			Blk A-42	Drilling
Western Oceanic	Western Triton III	Jackup	13.63	10000	EMSCO C-2	20,000	250			Contracted-CNG
TEXAS - NUECES										
Dixilyn-Field Drlg	50	Barge			National 130	25,000	8			Completing
Matagorda Drlg	Barge 4	Barge	10.00	3000	National 610	12,000	8		ST/TRK 197-1	Working
TEXAS - ORANGE										
Dixilyn-Field Drlg	DF-87	Jackup	13.63	10000	National 1320-UE	25,000	300			Available
Merit Drlg	5	Posted Barge	13.63	10000	OILWELL E-2000	25,000	20	12		Under Construction
TEXAS - PADRE ISLAND										
Penrod Drlg	61	Jackup	13.63	10000	EMSCO C-3	30,000	340	182		Drilling
TEXAS - SABINE PASS										
Global Marine Drlg	Glomar Tender I	Tender	13.63	5000	National 1625-DE	25,000		600	Gulf of Mexico Blk 13	Tenneco
Keyes Offshore	Keyes - 200	Jackup	13.63	10000	EMSCO 2000	20,000	200		Blk 10	Drilling
Marlin Drlg	Marlin #10	Platform	11.00	10000	National 610				Blk 13-A2	Completion Work
	Marlin No 1 Tender Type	Platform	13.63	5000	National 1320-DE	20,000		185	Blk 11-A3	Drilling
	Marlin 14	Jackup	13.63	1000	National 1625-DE	25,000	150	28	Blk 3	Drilling
Pool Offshore	80	Platform	13.63	5000	Ideco 2000	20,000			Blk 10-A	Working-Shell
Temple Drlg	Apache	Jackup	13.63	10000	OILWELL E-3000	30,000	55	42	Blk 9	Drilling
TEXAS - SHIP WRECK										
Marine Drlg	J Storm III	Jackup	13.63	10000	National 1625-M	25,000	250	26	Blk 173S	Drilling
TEXAS - SOUTH PADRE ISLAND										
Western Oceanic	Western Triton IV	Jackup	13.63	10000	EMSCO C-2	20,000	250			Contracted-McMoran
TEXAS - SOUTH PASS										
Dual Drlg	39	Platform	13.63	10000	OILWELL E-3000	25,000			Blk 89	Under Construction
	24	Platform	13.58	10000	OILWELL E-2000	25,000/5"			Blk 57	Drilling
	12	Platform	13.58	10000	EMSCO C-2	25,000/5"			Blk 89	Drilling
TEXAS - WILLACY										
Matagorda Drlg	6	Barge	10.00	3000	EMSCO GC-500	12,000	10		ST/TRK 386-1	Working
VIRGINIA - UNDESIGNATED										
Associated Marine Serv	Heron	Drillship			Howard-Turner	1,500/3½"	700	600		Ready to Move to FL
WASHINGTON - KING										
Associated Marine Serv	La Ciencia	Drillship			Howard-Turner	1,500/3½"	600	600		Stacked

RIG LOCATOR

For an additional copy of this Rig Locator, as a separately bound unit, check No: **175** on the Reader Service card.

Additional bulk copies of the Rig Locator may be purchased for **$2.00** each. Please send order and check to Service R&D Department,

PETROLEUM ENGINEER INTERNATIONAL, Box 1589, Dallas, Texas 75221.

AUCTION/PRIVATE SALE

INN OF THE GOLDEN WEST
ODESSA, TEXAS

OCTOBER 22 & 23
10:00 A.M.

CACTUS DRILLING CORPORATION IS PARTIALLY LIQUIDATING ITS DRILLING EQUIPMENT AND HAS COMMISSIONED NELSON INTERNATIONAL TO SELL FIVE COMPLETE RIGS, FOUR PARTIAL RIGS AND OTHER SURPLUS EQUIPMENT. THE PUBLIC AUCTION WILL BE CONDUCTED BY USE OF COLOR SLIDES AND THE EQUIPMENT WILL BE SOLD WITHOUT MINIMUM OR RESERVATION.

RIG 5–NATIONAL 75 Drawworks, 750 HP w/2-CAT D-379 Diesel Engines, BETHLEHEM G-65 & NATIONAL C-250 Duplex Pumps. (Near Moab, Utah)
RIG 24–NATIONAL 75 Drawworks, 500 HP w/3-CAT D-353E Diesel Engines, BETHLEHEM G-65 & NATIONAL C-350 Duplex Pumps. (Near Big Spring, Texas)
RIG 15–BETHLEHEM MC-650 Drawworks, 800 HP w/3-CAT D-353 Diesel Engines, BETHLEHEM G-65 & NATIONAL C-350 Duplex Pumps. (Near Hobbs, N.M.)
RIG 10–BETHLEHEM M-58 Drawworks, 700 HP w/2-CAT D-353 Diesel Engines, CONTINENTAL-EMSCO D500 & D300 Duplex Pumps. (Near Artesia, N.M.)
RIG 52–IDECO Hydrair H-35 Drawworks, 400 HP w/2-GM 6-71 Diesel Engines, CONTINENTAL-EMSCO D8550 Duplex Pumps. (Near Seminole, Texas)

Rigs 5, 10, 15 And 24 Are Offered For Private Sale Now! Any Of The Four Remaining Will Be Sold In The Auction.
Rig 52 Is Offered For Private Sale Only And Will Not Be Included In The Auction. Anyone Interested In These Rigs Should Contact Bill Archer At A/C: 214/561-1150.

4 PARTIAL RIGS (Public Auction Only):
3 Rigs With NATIONAL Drawworks And Related Equipment Too Numerous To List.
SALE INCLUDES:
Drawworks, Brakes, Compounds, Engines, Substructures, Crown Blocks, Pumps, Bops, Travelling Equipment, Rotary Tables, Drill Collars & Pipe And Related Equipment Too Numerous To List.

TxE-012-0111-JIM SHORT

Write/Call for Descriptive Brochure

NELSON INTERNATIONAL
AUCTIONEERS • LIQUIDATORS • APPRAISERS
POST OFFICE BOX 6170 • TYLER, TEXAS 75711
TELEPHONE AC 214/561-1150 • TELEX 73-5428

Circle 311 on Reader Service Card

Contractor	Rig name or no.	Type	BOP Stack		Drwwks make & model	Rated drlg depth with $4\frac{1}{2}$ in. pipe	Water Depth		Location	Status
			Size (ID)	Pressure rating			Rated	Current		
					WEST INDIES					
TRINIDAD										
Pool Santana	Rig #418-Offshore	Platform	10.00	5000	OIME	6,000			Galeota Point	Working
Skinmar Marine Operations	Skinmar 4	Platform	13.63	5000	OILWELL 840-E	16,000			East Coast	Drilling
	Skinmar II	Platform	13.63	5000	OILWELL E-2000	20,000	185			Stacked
	Skinmar III	Platform	13.63	5000	OILWELL E-2000	20,000	185	180		Stacked
	Skinmar I	Platform	13.63	10000	OILWELL E-2000	20,000	185		East Coast	Drilling
	Skinmar 5	Platform	13.63	5000	OILWELL 760	12,000			Gulf of Paria	Rigging Up
Well Services	10				National C-125	14,000				Stacked
	6	Platform	13.63	6000	National 80-B	12,000		80	Soldado	Working
	7	Platform	13.63	6000	Brewster 4210	8,000	85	80		Stacked
Zapata Offshore	Zapata Lexington	Semisubmersible	18.75	10000	OILWELL E-3000	25,000	2000	380		Drilling-Mobil